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George James Allman (1812–1898): pioneer in research on Cnidaria and freshwater Bryozoa

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Table of contents

Abstract

George James Allman (1812–1898), acclaimed for pioneering studies of Hydrozoa and Bryozoa, was born in Cork, Ireland. He earned B.A. (1839) and M.B. (1843) degrees at Trinity College, Dublin, and an M.D. (1847) from Trinity College and Oxford University. Choosing academia over medicine, he served as Professor of Botany, University of Dublin (1844–1855), and as Regius Professor of Natural History, University of Edinburgh (1855–1870). Allman initially undertook research on freshwater bryozoans, but his interests later turned to marine hydroids. His bibliography, with publication dates retraced herein, comprises more than 200 titles. Most important of these were monographs on limnic Bryozoa (1857) and "gymnoblastic" or anthoathecate Hydrozoa (1871, 1872). Other prime works were on hydroids from the Straits of Florida (1877) and from the *Challenger* Expedition (1883, 1888). He named 22 families, 64 genera and 283 species of Hydrozoa, along with three families and nine species of Bryozoa. Of these, names of some five families, 19 genera, and 146 species of hydrozoans, along with three families and three species of bryozoans, are currently recognized as valid. For distinguished academic service, Allman was awarded the Royal Medal (Royal Society of London, 1873), the Brisbane Prize (Royal Society of Edinburgh, 1873), the Cunningham Medal (Royal Irish Academy, 1878), the Gold Medal (Linnean Society of London, 1896), and an LL.D. from the University of Edinburgh (1873). He died 24 November 1898 in Parkstone, Dorset, England. Two genera and 22 species have been named in his honour.

Key words: bibliography, biography, hydroids, Hydrozoa, invertebrates, marine biology, natural history, taxonomy, zoology, zoophytes

Introduction

George James Allman, M.D., LL.D, F.R.S., F.R.S.E., F.L.S., etc. (1812–1898) was a prominent naturalist and academic during mid- and late nineteenth century. As a university professor in natural history, the discipline was a vocation for him rather than an avocation, as with many contemporaries having similar interests (e.g., Joshua

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Alder, 1792–1867, merchant; George Johnston, 1797–1855, and Thomas Strethill Wright, 1818–1876, physicians; Gustav Heinrich Kirchenpauer, 1808–1887, lawyer and statesman; Rev. Thomas Hincks, 1818–1899, and Canon Alfred Merle Norman, 1831–1918, clerics).

The scientific publications of George Allman, most of them listed in the *Catalogue of Scientific Papers* (Royal Society of London 1867, 1877, 1891, 1914), exceed 200 in number (214 are listed overall herein). With broad interests in natural history, he undertook studies across a spectrum of living organisms. Included were investigations on bacteria, fungi, protists, plants, and animals, and on subjects as varied as coral reefs, bioluminescence, fermentation, snow crystals, antique mining implements, and the character of hailstones. The animal kingdom was the main focus of his research, with studies on cnidarians, ctenophores, platyhelminths, bryozoans, entoprocts, annelids, molluscs, fossil and recent echinoderms, arthropods, fossil and recent hemichordates, and fossil and recent chordates, including fishes and mammals. His reputation and principal legacy, however, is based largely on investigations of hydroids and freshwater bryozoans. Studies on those groups, taken together, account for more than half of his publications. Within the cnidarian class Hydrozoa, Allman reportedly ranks second to Charles McLean Fraser (1872–1946) in numbers of named species (Schuchert 1998), even though his interests and research were far from being exclusively taxonomic.

A brief biography of Allman, together with an overview of his investigations on coelenterates (Cnidaria, Ctenophora), Bryozoa, and Entoprocta, is the purpose of this report. His publications on those four phyla are listed, with particular attention given to their dating. Some of Allman's works, including major monographs on freshwater Bryozoa and Entoprocta (Allman 1857a), and on Hydrozoa (Allman 1871b, 1872h), have frequently been misdated in the literature.

Methods

References by Allman were extracted from volumes of the *Catalogue of Scientific Papers* (Royal Society of London 1867, 1877, 1891, 1914), a bibliography on invertebrate animals by Thompson (1885), bibliographic works on Hydrozoa by Bedot (1910, 1912, 1916), and journals such as the *Proceedings of the Royal Irish Academy* and *Reports of the British Association for the Advancement of Science*. Except where noted, all references cited here were located and examined. With accurate dating of publications being critical in establishing priority of names in zoological nomenclature, particular efforts were directed towards establishing the chronology of these works. The month or even day of publication of a given paper, where stated, has been noted, although the reliability of such information may be uncertain. Issue dates of Allman's publications in the *Annals and Magazine of Natural History* follow Evenhuis (2003), and those in *Reports on the Scientific Results of the Voyage of H.M.S. Challenger* follow Low and Evenhuis (2013). Allman often published more than one paper in a given year, with some periodicals containing such articles providing only the year of publication. Moreover, certain volumes in which his papers appeared were published in undated parts extending over several years. To establish the likely sequence of such imprecisely dated works, approximate dates of publication were derived, where possible, from dated library acquisition lists or from reviews appearing in contemporary periodicals. Also documented herein are dates of any oral presentations of Allman's research before scientific societies, sometimes misinterpreted as publication dates, together with correct or approximate publication dates in the sense of the *International Code of Zoological Nomenclature* (ICZN). Reviews of works by Allman that were obviously written by other authors, such those by Joliet (1876a, b), are not included among his publications. Also excluded are reports of various committees of which he was a member, such as those of the British Association for the Advancement of Science.

Lists of available family-, genus-, and species-group names established by Allman for groups considered here, as well as original names assigned to higher taxa, are included in Appendices 1 and 2. Nomena nuda and incorrect subsequent spellings of available names have been excluded. Type species of genera, where known, are given, as are original provenances of species. With a few exceptions, current names of marine species follow those accepted as valid in the World Register of Marine Species (WoRMS) (http://www.marinespecies.org). References to the International Code of Zoological Nomenclature (ICZN) and to articles from it mentioned herein are based on the edition in use (International Commission on Zoological Nomenclature 1999) as this was written.

Publications by Allman that are unrelated to the scope of the present review, or otherwise uncited herein, are listed in Appendix 3.

Personal and professional life

Overviews of Allman's life and professional accomplishments appear in several obituaries (e.g., Anonymous 1898a, b, 1899a, b, c; 1901; Howes 1898, 1899; M'Intosh 1899; Hickson 1900, 1905), biographical dictionaries (e.g., Pollard 1901; Boase 1908; Praeger 1949; Pollard & Osborne 2004; Waterston & Shearer 2006), and tributes (e.g., Cornelius 1994). Similar in overall content but occasionally inconsistent in details, they provide glimpses of a gracious life as well as a productive academic career.

George James Allman (Fig. 1), eldest son of James Clugston Allman (1780–1845) and his wife Sarah Lane Allman (1780–1870), was born during 1812 in Cork, Ireland (a stated birthday of 24 November on some online sites, identical to the day and month of his death in 1898, is regarded as doubtful; a birth month of February on others needs verification). Siblings included two brothers and five sisters. His grandfather and patriarch of the family, George Allman, Sr. (1750–1827), was an affluent landowner and operator of a cotton mill near the town of Bandon in the south of Ireland. Following decline of their milling business, a successful whiskey distillery was established by the Allman family in 1826 (Barnard 1987). The Bandon Distillery of Allman & Company continued operation until the Prohibition Era in the United States, ceasing production in 1925 and closing in 1929 (http://www.irelandwhiskeytrail.com/?pg=allmans_bandon_distillery_cork.php, last visited 03 March 2015).

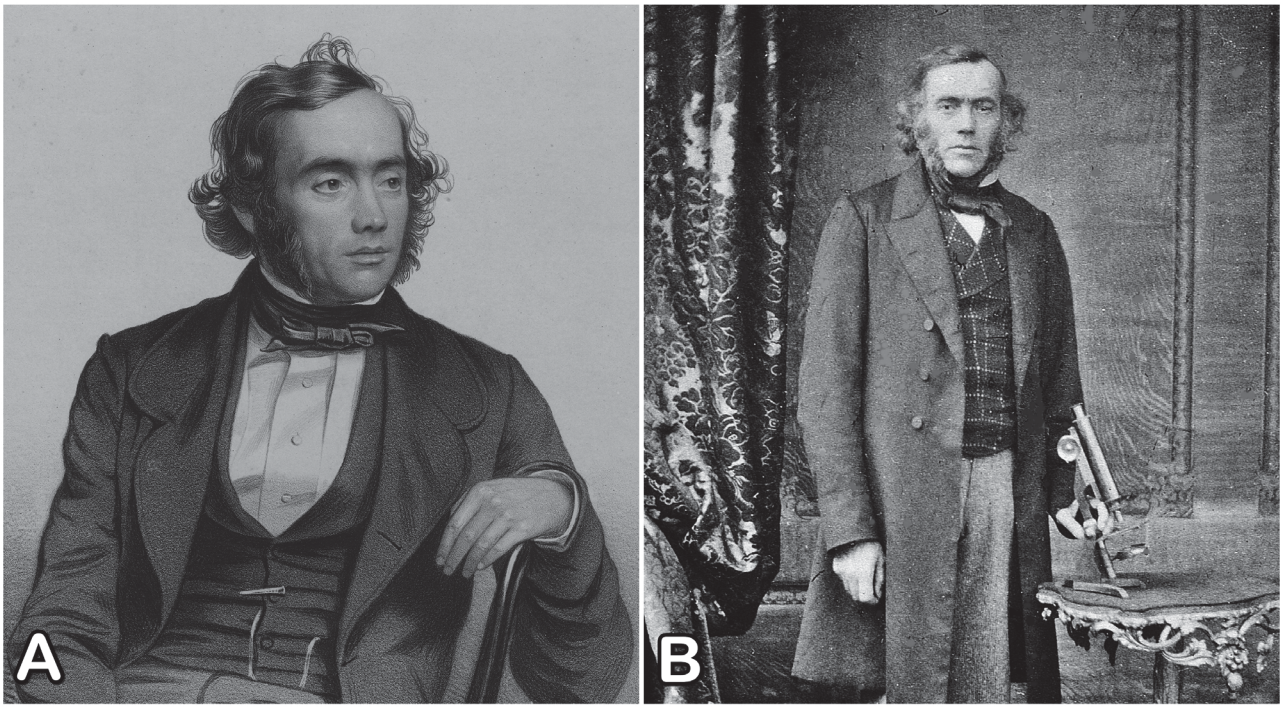

FIGURE 1. Prof. George James Allman, M.D., L.L.D., F.R.S., F.R.S.E., F.L.S. (1812–1898). A: portrait by Thomas Herbert Maguire, 1851, © National Portrait Gallery, London, UK. B: photograph by Maull & Polyblank, London, 1860s, © The Royal Society, Image No. RS 7734.

Following early education at the Belfast Academical Institution, Allman begun studies for the Irish Bar. Changing plans because of a growing interest in natural science, he left Belfast and entered Trinity College, Dublin, as a student in Arts and then Medicine, graduating with a B.A. in 1839 and an M.B. in 1843. He was awarded an M.D. degree from Trinity College and Oxford University on completing his medical training in 1847.

Just as he had earlier abandoned thoughts of a career in law, Allman never practiced medicine. His obvious expertise in biological science led to an appointment in 1844 as Professor of Botany at the University of Dublin, succeeding Professor William Allman, M.D. (1776–1846). Although having the same family name, the two men were not close relatives. During an 11-year academic career in Dublin, Allman's research interests concentrated increasingly on invertebrate zoology, with many of his early publications dealing in whole or in part with freshwater bryozoans and hydroids (Allman 1842, 1843a, b, 1844a–d, 1846b, 1847, 1848, 1850a–h, 1851a–c, 1853a–e, 1854a–d, 1855a).

In 1843, the British Association for the Advancement of Science (BAAS) held its annual meeting in Cork, Ireland. Allman attended and presented a paper (Allman 1844b) on the freshwater bryozoan *Plumatella repens* (Linnaeus, 1758). He remained an active member and supporter of the BAAS well into his retirement years, serving on various committees and delivering one or more papers at 22 different annual meetings between 1843 and 1879. In turn, *Reports of the BAAS* show that he received modest financial support for his research from the association over a number of years. His major official roles within the organization are noted elsewhere (see **HONOURS AND SERVICE)**.

Allman's personal life was enriched materially by his wife, Hannah Louisa Shaen Allman (?–1890) of Crix, Hatfield Peveral, Essex, England, whom he had married in 1846. The couple had no children. The Allmans maintained an active social life (Howes 1898) due in large part to "…the charm and energetic devotion…" of the talented Hannah Louisa (Anonymous 1899b). Friends of particular note included geologist Joseph Beete Jukes (1811–1869) in Dublin, as well as scientist and politician Lord Playfair (1818–1898) and Judge Alexander Burns Shand (1828–1904) in Edinburgh (Howes 1898). Allman's closest friendship, however, was with zoologist and palaeontologist George Busk (1807–1886) (M'Intosh 1899). After retirement and a move to Weybridge, Surrey, England, he was elected a member of the Athenaeum, a private member's club in London, during 1871 (Pollard & Osborne 2004). Liberal in religious beliefs, Allman was a Unitarian (Anonymous 1898a) like his friend and distinguished contemporary in hydroid and bryozoan research, the Reverend Thomas Hincks (Calder 2009), and in retirement provided substantial assistance to the Unitarian congregation in Poole, Dorset, near his home (Anonymous 1899a).

In 1855 Allman competed successfully for a vacancy at the University of Edinburgh, and was appointed Regius Professor of Natural History and Regius Keeper of Natural History Collections at the Natural History Museum of the university. He had been preceded at Edinburgh by Edward Forbes (1815–1854), and was succeeded by Charles Wyville Thomson (1830–1882), two legendary figures in marine science. Some dissatisfaction was initially expressed in Scotland over his appointment, likely resulting from comparisons with the brilliant Forbes but also from religious concerns (Anonymous 1898a; M'Intosh 1899). In opening remarks of his inaugural lecture, Allman (1855b) reflected on the loss of one he held as a friend, and noted "…how utterly impossible it is for any one to supply the place of Edward Forbes…." He soon earned acceptance and respect, particularly after publication of his scholarly treatise on freshwater Bryozoa (Allman 1857a).

Allman's courses in natural history at Edinburgh were well received. According to M'Intosh (1899), "…no professor, indeed, was more welcomed by the student of the day." His practice was to briefly recapitulate subject matter covered the previous day before moving on to new material, and he did not try to force too much information into a given lecture (Hickson 1900). Complementing his eloquence and genial disposition was exceptional artistic talent (M'Intosh 1899; Hickson 1905), with lectures regularly accompanied by illustrations, drawn on the blackboard, of organisms and their anatomy. Students were given an opportunity to participate in weekend field trips on the Firth of Forth, and to observe and study live organisms brought up by dredge and otter trawl (M'Intosh 1899). He is also known to have used a "towing net" to collect plankton samples (e.g. Allman 1873g). On retirement in 1870, a testimonial was held in his honour on 29 July (Pollard & Osborne 2004). Some of his students presented him with a much-cherished clock, bearing an inscription expressing their "…sincere regard for him as a GENTLEMAN, and their admiration of his talents and ability as a naturalist" (Howes 1898). Some humour may also have been intended in the choice of the gift, for Allman had often been observed hastening from home to classroom in order to arrive on time (M'Intosh 1899).

A source of discontent at Edinburgh arose from Allman's combined duties as professor and museum keeper. Friction between museum and university staff over use of collections, and over perceived neglect of curatorial responsibilities by university professors including Allman, intensified while he was there (http://www.nhc.ed.ac.uk/index.php?page=4.8, last accessed 6 March 2015). Relations had deteriorated to such an extent by 1876, after he had retired, that the museum officially separated from the university. To his credit, Allman oversaw a move of the natural history collections into a new museum building in 1866 during his tenure. The name of the institution was changed that same year to the Edinburgh Museum of Science and Art.

Three years after Allman moved to Edinburgh, abbreviated papers by Charles Robert Darwin (1809–1882) and Alfred Russel Wallace (1823–1913) were read before the Linnean Society of London on the Theory of Evolution by Natural Selection (Darwin & Wallace 1858). Although Allman had long been interested in comparative anatomy and in homologies of the animals he studied, evolutionary ideas were expressed infrequently in his

published research. His address as President of the Section of Biology of the British Association for the Advancement of Science in 1873 reflected a degree of ambivalence about the theory, beyond a few well-documented examples such as descent of the horse. In his opinion, more evidence was needed for evolution "to command instantaneous acceptance" (Allman 1874d). Moreover, he cautioned against attributing "…to it more than it can justly claim." As an example, he declared that it could not explain the "origin of the primordial protoplasm, and …its marvellous properties, which render evolution possible." Nevertheless, evolutionary theory offered "…a more satisfactory explanation …than any other hypothesis which has yet been proposed." Allman likewise acknowledged that "Evolution...has given a new direction to biological study, and must powerfully influence all future researches."

After 15 years in Edinburgh, Allman resigned in 1870 for reasons of unspecified ill health, although he is known to have suffered occasionally from asthma (Howes 1898; Anonymous 1899a). After leaving Edinburgh he reportedly resided in Weybridge, near London, and finally in Ardmore, Parkstone, Dorset (Pollard 1909; Cornelius 1994; Pollard & Osborne 2004), where he was able to enjoy reasonable health. Meanwhile, he appears to have kept a residence in London for a time; *Reports of the British Association for the Advancement of Science* through the 1870s list several different addresses for Allman in the city (Gloucester Road; Marlborough Road; Queen Anne's Mansions). Reports for 1878 and 1879 give his addresses as Queen Anne's Mansions, St. James's Park, London, S.W., and Parkstone, Dorset. At Parkstone, on a property of some 5–6 acres (Howes 1898) overlooking Poole Harbour, he indulged a love of horticulture while continuing academic work. His beautiful gardens, landscaped with ponds and rivulets, contained a splendid collection of rare plants including rhododendrons, gunneraceans, and bamboo (Howes 1898; Anonymous 1899a). A neighbour and friend in Parkstone was none other than Alfred Russel Wallace (Howes 1898).

Busy though he remained with academic work, moves, and upkeep of his various properties after retirement, Allman took time to travel. Accounts are given of botanizing on the Mediterranean coasts of France and Italy (Allman 1880f, 1882b). Even earlier, a few months before retirement, he had been in Naples, Italy (Allman 1870). While complaining about unusually cold weather during his January stay, with snow on Vesuvius, he greatly admired the scenery and beauty of both indigenous and introduced floras of the region.

While Allman reportedly suffered from muscular ailments over the last few months of his life, his sight, hearing, and intellect remained keen to the end (Howes 1898). Having lost his wife in 1890, he was cared for late in life by relatives, and especially by several nieces. On 24 November 1898, a few hours after having visited his garden, he died quietly in his armchair (Howes 1898). A privately printed volume of poems written by Allman was delivered to his home that same day (Howes 1898; Cornelius 1994). He was buried 29 November 1898 in Poole Cemetery, Poole, Dorset (Pollard & Osborne 2004).

A tribute to Allman in the *Proceedings of the Linnean Society of London* (Anonymous 1899b) tells us much about his personal character. He was described as "A noble man (dignified, temperate, considerate), a good friend, an earnest student, he set unto himself high ideals and realized them in an exemplary manner…." In his scientific work, "… Prof. Allman brought to bear on his subject a cultured intellect, keen observation, philosophic spirit, and sound deduction, while his gifts in artistic delineation of the beautiful forms to which he specially devoted himself give his works a solidity and charm all their own" (M'Intosh 1899).

Research, early career (1840–1857)

Allman's bibliography reflects the broad interests in natural history that he maintained throughout his life. His first scientific publication (Allman 1840) provided an account of a personal experience with the venomous lesser weeverfish (*Trachinus vipera*; now *Echiichthys vipera*). He had picked up the fish and been envenomated on the thumb by a spine. An account of that painful experience was complemented with morphological details of an opercular spine of the fish, which he believed was the source of the sting. By 1843, he had also published notes or abstracts on freshwater bryozoans and hydroids (Allman 1842, 1843a, b), as well as on algae, tracheophytes, molluscs, and mammals (Appendix 3).

The primary emphasis of Allman's research in the 1840s was on the biota of fresh waters and particularly on limnic bryozoans and other "zoophytes." Collections of them were made in lakes and ponds, especially those in County Cork, Ireland (including at the Dublin Zoological Gardens and the Bandon Distillery); in canals, including

the Grand Canal near Dublin, the Chelmer Canal in Essex, England, the Regent Canal, London, and the Union Canal, Edinburgh; and in rivulets and rivers, such as the Thames River, England, and the Bandon and Dodder rivers, Ireland. Notable from this work were discoveries of the freshwater hydroid *Cordylophora lacustris* Allman, 1843b [now *C. caspia* (Pallas, 1771)] and the phylactolemate bryozoans *Plumatella emarginata* Allman, 1844a, *P. fruticosa* Allman, 1844a, and *Fredericella dilatata* Allman, 1844a [now *F. sultana* (Blumenbach, 1779)]. Included within Bryozoa at the time were entoprocts as well as gymnolaemates and phylactolaemates.

An observant microscopist, Allman was one of the earliest, after Corda (1836) and Ehrenberg (1836, 1838), to recognize the likely function of nematocysts (Allman 1845a; 1846a). In discussing the "transparent oval capsules" (holotrichs) of an unidentified corallimorpharian (later described as *Corynactis viridis* Allman, 1846), Allman (1845a) accurately described the nature of their discharge and correctly suggested that they were envenomating organelles, equivalent to those described earlier in a species of *Hydra* Linnaeus, 1758 by Corda (1836). In a paper read during February 1852 but not published until eight years later, Allman (1860i) maintained that the body plans of hydroid polyps and medusae were homologous (Allman 1860i). In studies on reproduction of hydroids, he recognized that their gonosomes consistently assumed a medusoid structure in some form, even when such gonophores were fixed (Allman 1853b, 1853d, 1855a). Widely used terms defined by him in other works included ectoderm and endoderm (Allman 1853e) and coenosarc (Allman 1854b).

By the 1850s, Allman had become the leading specialist on freshwater Bryozoa (Polyzoa) worldwide. Culminating his research on the group were two noteworthy publications, the first a preliminary digest of existing knowledge of these invertebrates (Allman 1851a) and the second an exhaustive monograph on them (Allman 1857a).

In the preliminary paper (Allman 1851a), Allman adopted the name Polyzoa instead of Bryozoa for the group, believing the first of these had priority. That usage was continued in all of his subsequent papers on them. The report included an account of the anatomy, physiology, embryology, taxonomy, and distribution of freshwater polyzoans, and introduced the now familiar terms ectocyst, endocyst, coenoecium, and perigastric space as applied to the group. Other terms of note established later included statoblast (Allman 1856) and epistome (Allman 1857a). Two new families (Cristatellidae and Plumatellidae, widely attributed in later literature to Allman 1857a), were established, as were five new species (with names often credited in error to "Allman, 1850"): *Alcyonella benedeni* Allman, 1851a [now *Plumatella emarginata* Allman, 1844a], *Plumatella coralloides* Allman, 1851a [now *P. fungosa* (Pallas, 1768)], *P. elegans* Allman, 1851a [now *P. repens* (Linnaeus, 1758)], *P. dumortieri* Allman, 1851a [now *P. repens* (Linnaeus, 1758)], and *P. jugalis* Allman, 1851a [now *P. emarginata* Allman, 1844a] (Appendix 1). Two other terms familiar in studies of bryozoans, polypide and lophophore, had been introduced the previous year (Allman 1850d: 473, 474).

Many names applied to phylactolaemates and entoprocts by Allman are misdated in both print and in contemporary (2015) online sources. Some of these appeared in papers earlier than generally recognized, while others are credited to misdated publications. For example, Allman's (1857a) classic monograph on Polyzoa, in a Ray Society Publication, is almost universally misdated as 1856 following information on the title page. Instead, evidence points to its publication during the summer of 1857. The dedication page of the volume bears a date of "May 2, 1857," and it was not received at the library of the nearby Geological Society of London until sometime between 1 July and 31 October 1857 (see *Quarterly Journal of the Geological Society of London* 14: pages 79 and 88). At the Annual Meeting of the Ray Society for 1857, held during the Twenty-seventh Meeting of the British Association for the Advancement of Science in Dublin, commencing 26 August 1857, an announcement was made that members had received copies of the work (see *The Athenaeum* 1558: 1114).

The monograph represents a milestone in studies of freshwater bryozoans. A synopsis was provided of their morphology, physiology, reproduction, development, relationships, geographic distributions, literature, and history including the first discovery in 1741 of a phylactolaemate bryozoan, described as the "Polype à Pannache" [*Lophopus crystallinus* (Pallas, 1766)] by Trembley (1744: 210). In a systematic account, 21 species were taken to be valid, with 17 of them reported from Europe and six from North America. Species were arranged within the most comprehensive classification of the group that had been proposed to that date. Two new orders of Polyzoa were distinguished and assigned the names Gymnolaemata and Phylactolaemata (Allman 1857a: 10), both still widely used. Phylactolaemates in Allman's classification included the suborders Lophopea (freshwater "polyzoans") and Pedicellinea. Assigned to the gymnolaemates were the familiar bryozoan orders Cyclostomata, Ctenostomata, and Cheilostomata, as well as Urnatellea and Paludicellea, groups now known to be entoprocts.

Allman placed the genus *Urnatella* Leidy, 1852, and its type and single known species *U. gracilis* Leidy, 1852, amongst the gymnolaemates with considerable reservation. Noting its resemblance to the marine genus *Pedicellina* M. Sars, 1835, he noted "I feel much tempted to place *Urnatella* in the suborder Pedicellinea" (Allman 1857a: 119). Given a lack of knowledge about its anatomy, however, he provisionally retained it along with Paludicellidae Allman, 1844a in Gymnolaemata. Both Pedicellinidae Johnston, 1847 and Urnatellidae Allman, 1857a are now assigned to the phylum Entoprocta, while Paludicellidae is included as a family of ctenostome bryozoans. Accompanying the text were 11 plates with figures drawn by Allman, 10 of them in colour, as well as 17 woodcuts (Fig. 2A). That same year notes were published on the structure of *Pedicellina* (Allman 1857b) and on reproductive phenomena in a phylactolaemate bryozoan (Allman 1857c). He is credited also for having contributed illustrations of freshwater Bryozoa for Carus's (1857) *Icones Zootomicae*.

Complimenting Allman's contributions to knowledge of freshwater bryozoans, later in the nineteenth century, were tomes by Kraepelin (1887, 1892). Recent overviews of them include works by Lacourt (1968) and Massard & Geimer (2008), who recognized 69 species worldwide. As with many groups, molecular studies are helping resolve the taxonomy and phylogeny of the group. Phylactolaemates have been regarded as bryozoans and not "radiates" since the early nineteenth century, but recent DNA sequences suggest a closer affinity of the group to Phoronida and Brachiopoda than to Cheilostomata and Ctenostomata (Wood & Lore 2005). Allman (1853a, 1853c, 1857a) had incorrectly been convinced of an affinity between Polyzoa and Tunicata, but he also recognized the remarkable resemblance of the group to the phoronid worm *Phoronis hippocrepia* (see Allman 1857a).

Over the 15-year period from 1842 to 1857, and the publication of his monograph, Allman had been the author of 24 publications on freshwater Bryozoa. Knowledge of the group advanced materially from his labours. However, only four more papers on them appeared over the 40 years between 1858 and his death in 1898. His prime interest turned instead to hydroids, although his pursuits in natural history continued to be eclectic. The shift roughly coincided with a move in 1855 from Dublin to Edinburgh, and away from the fresh waters of Ireland that he knew so well. Perhaps he sensed that continued work on a freshwater fauna of limited diversity might yield diminishing returns, whereas the oceans abounded with understudied hydroids, a group with which he was already somewhat familiar. Whatever his motivations, on completion of the landmark monograph on limnic polyzoans, his research took a different direction. His work on hydroids to that point, in some 14 papers, had been largely on the freshwater genera *Hydra* and *Cordylophora* Allman, 1843b. Only two (Allman 1853b, 1853d) dealt, at least in part, with marine species. That environmental emphasis was about to change as well.

Research, mid–career (1858–1872)

This phase of Allman's research began with investigations on comparative anatomy of reproductive structures, origin and development of gametes, post-fertilization development, and asexual as well as sexual reproduction in marine hydroids (Allman 1858, 1859a, b–f, 1860b, g, 1861, 1863b, 1864b, d). In addition, different life cycle patterns exhibited in Hydrozoa were addressed as part of this work (Allman 1864d). Several now-familiar terms in hydrozoan morphology were introduced, including blastostyle, gonophore, sporosac, manubrium, and corbula (Allman 1858), spadix (Allman 1859a), meconidium (Allman 1859d), acrocyst (Allman 1860b), trophosome and gonosome (Allman 1864b), hydranth (Allman 1871a), and perisarc, hypostome, hydrorhiza, and hydrocaulus (Allman 1871c). The appropriateness of a few of the earliest of these terms, questioned by Huxley (1859), was further justified by Allman (1860g).

In having moved to Edinburgh, Allman also initiated studies on hydroid diversity in the Firth of Forth, Scotland. An awkward situation arose almost immediately because Strethill Wright was collecting and studying hydroids in the same area. Two species from the estuary were described as new under different generic and specific names by the men (Wright 1859a; Allman 1859c), with their papers both appearing in July of that year. In a testily-written comment shortly after, Wright (1859b) claimed priority for his work because it had been read in January 1859 at a meeting of the Royal Physical Society of Edinburgh. In reply, Allman (1859d) considered his names and those of Wright to essentially be simultaneous synonyms. Although Wright's work was not made available nomenclaturally from his oral presentation in early 1859, *Bimeria* Wright, 1859a, *Garveia* Wright, 1859a, *B. vestita* Wright, 1859a, and *G. nutans* Wright, 1859a, were soon taken to be senior synonyms respectively of *Manicella* Allman, 1859c, *Corythamnium* Allman, 1859c, *M. fusca* Allman, 1859c, and *Eudendrium bacciferum* Allman,

1859c (also introduced under the binomen *Corythamnium bacciferum*) (e.g., see Hincks 1868). Looking back, Allman's (1859c) publication, now dated 01 July 1859 (see Evenhuis 2003), may have appeared earlier than Wright's, dated July 1859. In the interests of nomenclatural stability, however, his unused names should not be resurrected. *Coryne briareus*, the third and final putative new species described at this time by Allman (1859c), was later included by him (Allman 1864b) and others as a junior synonym of *Zanclea implexa* (Alder, 1856b). Overall, it was an inauspicious start in marine hydroid taxonomy for the new professor at Edinburgh. Allman nevertheless persevered in his work on hydroids, subsequently recognizing additional new species from the Firth of Forth, with two having currently valid names. *Laomedea loveni* Allman, 1859d (now *Gonothyraea loveni*) is a widely known campanulariid in boreal waters of the North Atlantic region. Also familiar, in both its hydroid and medusa stages, is the corynid *Coryne eximia* Allman, 1859d (Fig. 2B). In other work at about the same time, Allman (1860e) provided a brief account of parasitism by juvenile pycnogonids of some species of *Coryne*, now known to be a common occurrence in hydroids.

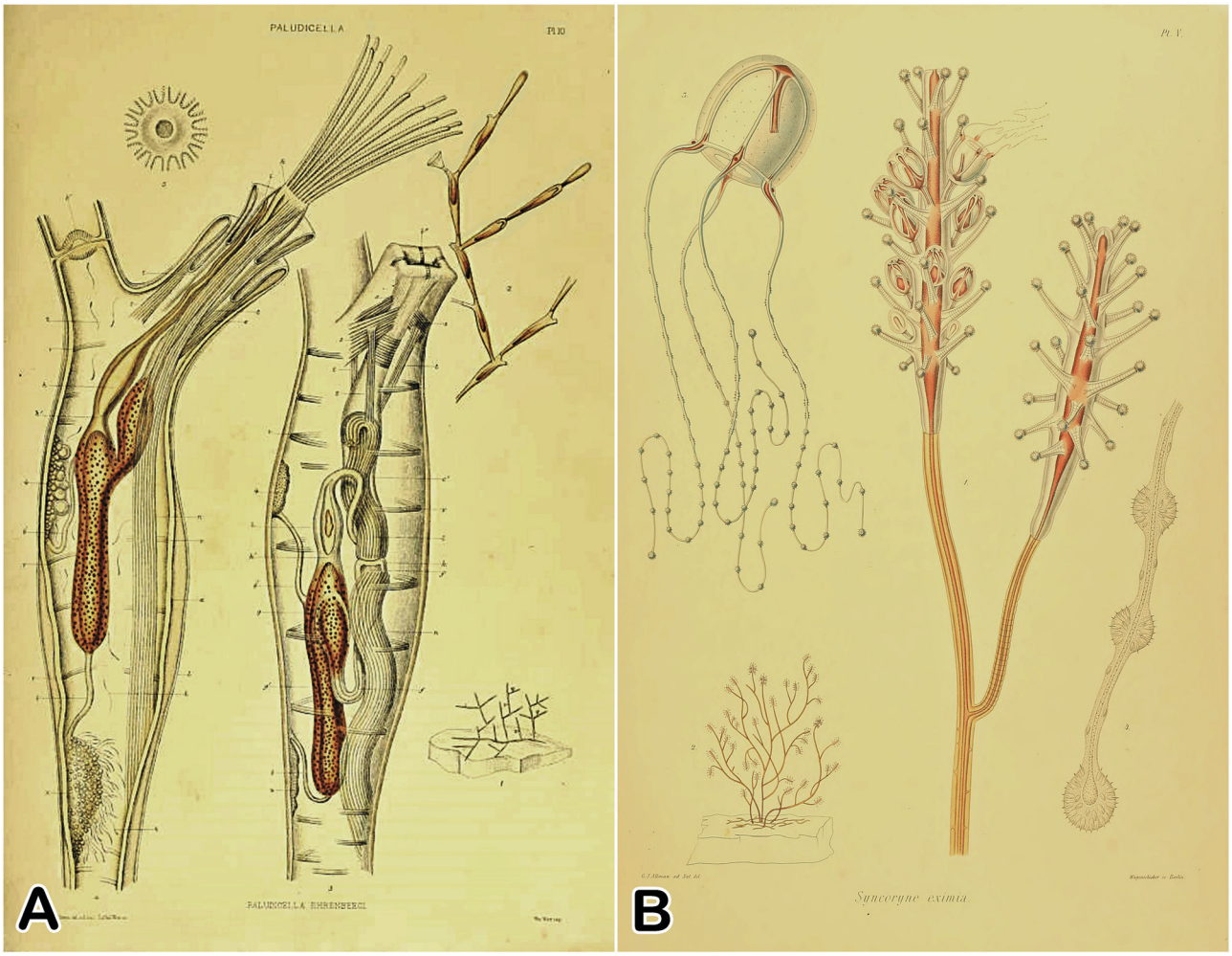

FIGURE 2. Illustrations from two monographs on invertebrate animals by George James Allman. A: Plate 10 from Allman (1857a), showing the ctenostome bryozoan *Paludicella ehrenbergii* Van Beneden, 1848 [=*P. articulata* (Ehrenberg, 1831)] with extended (left) and retracted (right) lophophores. B: Plate 5 from Allman (1871c), showing hydroid and young medusa stages of the hydrozoan *Syncoryne eximia* (Allman, 1859d) [=*Coryne eximia* Allman, 1859d].

Meanwhile, several species of cnidarians were obtained by Allman during a trip to the Orkney Islands in August 1858 (Allman 1859f, 1860c, d). One new genus (*Dicoryne*) and three new nominal species of hydroids were described from the collections (Allman 1859f). Although names of the new nominal species were all eventually placed in synonymy (Appendix 2), the generic name *Dicoryne* Allman, 1859f remains valid. The remarkable free-swimming sporosacs of its type species, *Dicoryne stricta* Allman, 1859f [=*Dicoryne conferta* (Alder, 1856a)], were described in detail by Allman (1861) (and see Ashworth & Ritchie 1915). Also collected

while at Stromness in the Orkneys was the staurozoan *Lucernaria cyathiformis* M. Sars, 1846. Although Allman (1860a) assigned it to a new genus, *Carduella*, it is now included in *Depastrum* Gosse, 1858 (see Appendix 2). Over his career, four notes on Staurozoa were published by Allman (1845b, 1860a, f, h).

During the summer of 1861, the ctenophore *Beroe ovata* Bruguière, 1789 appeared in great numbers inside the Firth of Forth. It was not seen there again during Allman's tenure in Edinburgh. Three papers were published on *B. ovata* based on observations made that summer. The first (Allman 1862a) provided a brief account of its bioluminescence, with an observation that these comb jellies did not emit light during the day. Animals removed from daylight to a dark room in a glass jar required about 20 minutes before any indication of bioluminescence became apparent. After that time interval, however, as much light was emitted as at night. Both adults and embryos were found to be luminescent. The second paper on the species (Allman 1862b) provided an account of its morphology and development. Two decades later, in an anniversary address as President of the Linnean Society of London, Allman (1882a) summarized recent advances that had been made in knowledge of the development in Ctenophora. His own work from 1861 provided a starting point for the presentation. A decade earlier, the morphology of *Beroe* had also been briefly considered in a couple of publications on homologies within the Coelenterata (Allman 1872b, c).

While Professor of Natural History at Edinburgh, Allman took students on field trips. During one of these, a student discovered hydroids of *Corymorpha nutans* M. Sars, 1835 in a dredge haul from the Firth of Forth. Both hydroid and medusa stages of the species were described in detail (Allman 1863a). Medusae liberated from the hydroids survived for more than a week in the laboratory, but they did not grow or reach maturity. A more fully developed medusa of the same species was collected in a plankton tow from the same general locality. In a second part the same paper, an account was given of one new genus, seven new species, and one new variety of hydroids collected in Shetland and Devon, UK, during the autumn of 1862 (Appendix 2). Two of the species, *Eudendrium vaginatum* Allman, 1863a and *Bougainvillia muscus* (Allman, 1863a), are still valid. The two parts of Allman's paper were also presented at a meeting of the British Association for the Advancement of Science in 1862 and published separately as abstracts (Allman 1863c, d).

By 1864, Allman's knowledge of marine hydroids had advanced to a significant extent. His first publication that year (Allman 1864a), and a subsequent abstract of it (Allman 1865a), recorded observations on nematophores of the plumularioids *Aglaophenia pluma* (Linnaeus, 1758) and *Antennularia antennina* (Linnaeus, 1758) (=*Nemertesia antennina*). Their contractions and extensions were compared by him to those of an *Amoeba*, with its pseudopodia. Allman's growing reputation as a hydrozoan taxonomist was bolstered by his next paper (Allman 1864b), which provided a synopsis of families, genera, and species of "tubularian" and "campanularian" hydroids (excluded were major groups of Hydrozoa including haleciids, plumularioids, and sertulariids). Several important principles in systematics of Hydrozoa were emphasized in the introduction. These included (1) the logic of employing unified classification and nomenclature for hydroids and hydromedusae, where practicable; (2) the importance of considering both trophosome and gonosome (whether fixed sporosacs or free medusae) in diagnosing genera and species, and in formulating classifications; (3) recognition that both isogonism (taxa having morphologically similar gonosomes, but dissimilar trophosomes) and heterogonism (taxa having morphologically similar trophosomes, but dissimilar gonosomes) exist in the group; (4) awareness that newly liberated medusa stages are usually immature, and that their morphology may change considerably during development; (5) adoption of the oldest name assigned to a given taxon, irrespective of the life cycle stage to which it was originally applied. Diagnoses were given of 56 genera, with a list of species assigned to each one. Of 10 genera recognized as new, only *Gonothyraea* Allman, 1864b remains valid today. The work nevertheless remains an important one in the history of hydrozoan taxonomy.

Two months after the appearance of Allman's (1864b) synopsis, a "supplemental and corrective" note to it was published (Allman 1864c). Included were full descriptions of six species, all thought to be new. Names given to two of them (*Heterocordyle conybearei* and *Campanulina repens*), with their distinguishing characters noted in accompanying generic diagnoses, were made available in the earlier work (Allman 1864b). In addition, the genus name *Heterostephanus* Allman, 1864c was established as a nomen novum for *Heteractis* Allman, 1864b. Thought to be invalid because of homonymy with the name of a plant, the latter name is actually a junior homonym of the anthozoan genus name *Heteractis* Milne Edwards & Haime, 1851. *Heterostephanus* is now included in the synonymy of *Euphysa* Forbes, 1848. Of all specific names introduced as new in these two papers, only *Heterocordyle conybearei* Allman, 1864b [=*Dicoryne conybearei* (Allman, 1864b)] is now thought to be valid. A

second part of the same paper provided an account of the cnidophores (highly extensile peduncles, bearing terminal nematocysts) on tentacles of medusae of *Zanclea implexa* (Alder, 1856b). In a final paper published that year, Allman (1864d) gave a detailed account of the morphology of reproductive structures in hydrozoans, and reviewed methods of both sexual and asexual reproduction in the group. Excellent illustrations accompanied the text.

Continuing his studies of hydroids in Scottish estuaries, Allman (1865b) described *Syncoryne pulchella* as a new species from tide pools in the Firth of Clyde. Although his account included a description of its young medusa stage, the identity of the species remains unsettled (Schuchert 2001). Authors including Russell (1953), Edwards (1978), and Cornelius (1994) included *S. pulchella* in the synonymy of *Sarsia tubulosa* (M. Sars, 1835). When combined with *Sarsia* Lesson, 1843, however, *Syncoryne pulchella* becomes a junior homonym of *Sarsia pulchella* Forbes, 1848, a binomen also included by Russell (1953) in the synonymy of *S. tubulosa*. The species described by Forbes, and that of Allman, are both considered as taxa inquirenda in WoRMS (last checked 05 January 2015).

Three years passed before Allman's next publication on Cnidaria, in 1868. The lapse may have been due to a heavy workload at the University of Edinburgh, although work was also underway at the time on his magnum opus, a monograph on "gymnoblastic" (anthoathecate) hydroids (Allman 1871c, 1872h). Allman's (1868) publication that year was an abstract of studies on the morphology of three genera of hydromedusae. Moreover, only two minor publications on hydroids appeared the following year. The first (Allman 1869a) provided a description of a single new species (*Coryne nutans*) in a report by Norman (1869) on results from a dredging expedition to the Shetland Islands. The hydroid, a sterile colony from sea caves at Burrafirth, was regarded as "provisional" by Allman (1872h) and indeterminable by Schuchert (2001). The second publication (Allman 1869b) was an abstract providing details on the morphology of *Coppinia arcta* (Dalyell, 1847), together with a revised generic diagnosis of *Coppinia* Hassall, 1848. *Coppinia* and *C. arcta* were names later shown to have been based on aggregated gonophores of lafoeid hydroids (Levinsen 1893; Cornelius & Calder 1986), and not on distinct taxa.

Although Allman retired in 1870, his most productive years of work on hydroids were yet to come. Three publications appeared in 1871, including Part I of a monograph on gymnoblastic hydroids (Allman 1871c). His first paper of the year (Allman, 1871a) described *Schizocladium ramosum*, a supposed new genus and species of hydroid. It was believed to differ from campanulariids of similar morphology in reproducing asexually by fissiparity. Most recent authors have followed Cornelius (1975a, 1982) in referring it to the synonymy of *Obelia dichotoma* (Linnaeus, 1758). Another paper (Allman 1871b) addressed succession of zooids in hydroid colony formation, and noted different patterns of metagenesis in hydrozoans. Allman, a capable botanist, compared and contrasted some of these patterns with life cycles of plants.

Allman's monograph on global gymnoblastic hydroids (Allman 1871c, 1872h) is widely taken to be one of his two most important works overall, together with the earlier treatise on freshwater bryozoans (Allman 1857a). A large part of its content was based on his own field work and research. Although museum collections in continental Europe were examined by him, hydroids were poorly represented in them and seldom consisted of anything other than dry material of common species (Allman 1871c: ix). Most of his collecting was undertaken around the British Isles, although sampling also extended into the Mediterranean and Adriatic seas. His artistic skill (Fig. 2B) was of particular importance in characterizing soft-bodied organisms that became malformed when placed in the inadequate preservatives of the day. Included with the text were 23 colour plates and 84 woodcuts. According to Cornelius (1994), "The book is one of the most detailed systematic volumes on hydroids ever published and is by far the best illustrated….Allman drew all the figures from life, and ensured that their coloration was accurate." For decades its only peer as a prime hydroid reference was *A history of the British hydroid zoophytes* by Hincks (1868). The latter work was clearly superior to Allman's in terms of nomenclature, particularly in the formation of names and in adherence to the Principle of Typification (see Calder 2009: 195), but the tomes were for the most part complementary. Allman's hopes of preparing an equivalent volume on hydromedusae (Allman 1871c: viii) were never realized.

Although often cited as a single work published in 1871, Allman's hydroid volume was published in two separate issues, in successive years, because its total cost of £800 was unaffordable for the budget of the Ray Society during a single year (Curle 1954: 38). The first 154 pages of Part I, *The Hydroida in general* (Allman 1871c), dealt primarily with morphology and physiology. It included plates 1–12. The *Conclusion of Part I, and Part II, containing descriptions of the genera and species of the Gymnoblastea*, provided information on distribution and systematics of anthoathecate hydroids and their medusae, where known (Allman 1872h). Included in it were plates 13–23. The systematic account included detailed diagnoses of 21 families, 49 genera, and 116

species of hydroids assigned to the Gymnoblastea (=Anthoathecata). Of these, seven families, six genera, and nine species were recognized as new to science. It is striking from Allman's synopsis how poorly known hydroids were at the time outside the North Atlantic Ocean and Mediterranean Sea. Of 116 gymnoblastic species considered in detail by him, 93 were reported from Europe, 25 from the Atlantic coast of North America, and one each from the Pacific coast of North America, the Atlantic coast of South America, and the Pacific coast of South America. No gymnoblastic species were reported in the monograph from Asia, Africa, Australia, or Antarctica. That enormous gap in scientific knowledge was about to be addressed, however, with examinations of large collections from major ocean expeditions such as those of H.M.S. *Challenger* and U.S.S. *Albatross*, and pioneering work on hydroids in many countries around the world. Allman was to play a leading role in that rapid expansion of knowledge. Moreover, he and several of his contemporaries elevated the standard in presenting accounts of newly recognized hydroid taxa (Hickson 1900).

In addition to Part II of his monograph, seven other publications by Allman appeared in 1872. These included a review of studies by the German zoologist Franz Eilhard Schulze (1840–1921) on morphology and development of *Cordylophora* (Allman 1872a), remarks on supposed relationships between graptolites, hydroids, and "Rhabdophora" (=pterobranchs) (Allman 1872b), a discussion of homologies in coelenterates (Allman 1872c, d), an account of a new species of fossil hydroid (*Hydractinia pliocena*) from the Coralline Crag, East Anglia (Allman 1872e), and morphological notes on the the sea anemone *Edwardsia* (Allman 1872f), as well as a short paper on *Cyphonautes*, now known to be a bryozoan larval stage (Allman 1872g).

Research, late career (1873–1896)

Although Allman had retired from the University of Edinburgh in 1870 and had moved south to England, his research efforts, especially on hydroids, continued unabated. The year 1873 marked the beginning of a new phase of Allman's work on these cnidarians, with a much greater emphasis on alpha taxonomy. A major focus of his investigations from then until the late 1880s involved examinations of hydroids collected by major expeditions. A preponderance of his named taxa were established during this period (Appendix 2).

Allman's publications during 1873 included two on hydroids (Allman 1873a, b), two on coral islands (Allman 1873c, d), abstracts of research published earlier on the anthozoan *Edwardsia* (Allman 1873e) and the bryozoan *Cyphonautes* (Allman 1873f), and a report on organisms (including hydromedusae) in plankton samples from the south coast of Ireland (Allman 1873g). The first of these papers (Allman 1873a) put forth a hypothesis that "gonangia" (gonophores) in species of *Halecium* were modified internodes rather than being homologous with gonophores of other calyptoblastic (thecate) hydroids. The evidence was taken to be more apparent in female than in male gonangia. His ideas have been discounted by subsequent discoveries of haleciid species having gonophores typical of thecate hydroids. The second note (Allman 1873b) provided a progress report on examination of a hydroid collection from explorations in the Straits of Florida by Louis François de Pourtalès (1824–1880) of the United States Coast Survey. Some 73 species had been been identified, with 63 of them being undescribed. The new species were not named and made available until later (Allman 1877). The two papers on coral islands (Allman 1873c, d) provided general accounts of corals, coral reefs, and atolls, and ideas on population of coral islands by humans, and were not based on original research. The final paper of the year (Allman 1873g) reported on organisms captured in plankton tows off the south coast of Ireland. Included were two species of hydromedusae, one thought to be a new genus and species (*Ametrangia hemispherica*) and the other a new species (*Circe invertens*). The two are now regarded as conspecific with *Dipleurosoma typicum* Boeck, 1866 and *Aglantha digitale* (O.F. Müller, 1776), respectively (Appendix 2).

All seven of Allman's publications on invertebrate animals in 1874 dealt with Cnidaria. These included (1) a review of the classic monograph on anatomy and development of *Hydra* by Nicolaus Kleinenberg (1842–1897) of Germany (Allman 1874a), (2) a taxonomic report on hydroids collected during expeditions of H.M.S. *Porcupine* (Allman 1874b), (3, 4) two papers on polyps of coronate scyphozoans (*Stephanoscyphus*) that he mistook for a new group of hydroids (Allman 1874c, f), (5) a repeat account of the plankton study published the previous year (Allman 1874e), (6) a description (Allman 1874g) of the morphology and development of the anthoathecate hydroid *Myriothela phrygia* (Fabricius, 1780) (= *Candelabrum phrygium*), and (7) a summary (Allman 1874h) of a paper read before the Linnean Society of London on new genera and species of hydroids, described more fully later

(Allman 1876b). Nevertheless, names of two new genera (*Gemminella* and *Taxella*) and 10 new species [*Hydractinia monocarpa*, *Cladocoryne pelagica*, *Amalthaea islandica*, *Campanularia grandis*, *Thuiaria coronata*, *Sertularella episcopus*, *Thuiaria cerastium*, *Macrorhynchia insignis* (as *Makrorhynchia insignis*), *Taxella eximia*, and *Sertularia arctica*] were made available in that preliminary note (Appendix 2).

The most noteworthy of these seven papers dealt with hydroids from expeditions of H.M.S. *Porcupine* (Allman 1874b). Due in large part to the influence of Edward Forbes, great interest in the deep-sea and its biota had arisen during the middle decades of the nineteenth century. Extensive dredging was undertaken around the British Isles to determine which groups were represented at various depths, to establish biogeographic affinities of the fauna, to discover whether life even existed below a certain level, and to ascertain whether species at great depths might be relics. The 1869 survey of H.M.S. *Porcupine*, in bathyal and abyssal regions north, west, and south of the British Isles, has been called "the first great oceanographic expedition" because of its superior equipment, organization, and multidisciplinary nature (Mills 1983). A second expedition, in 1870, explored areas from the British Isles to the Mediterranean Sea. Of 26 species of hydroids identified by Allman (1874b) from the expeditions, 11 were described as new. Two new genera were also recognized, with one of them, *Cladocarpus* Allman, 1874b, now known to include some 50 species (WoRMS) that are particularly well represented on bathyal bottoms worldwide. The deepest records (*Lafoea halecioides* Allman, 1874b, *Thuiaria laxa* Allman, 1874b, *T. hippuris* Allman, 1874b, and *Halicornaria ramulifera* Allman, 1874b) were from 640 fathoms (1170 m) in the Faroe-Shetland Trough. Two fragments of a hydroid had apparently also been recovered from a depth of 2435 fathoms (4453 m) in the West European Basin SSW of Ireland (Carpenter *et al*. 1869: 429), but the specimens were never received by Allman.

Also of significance among Allman's papers that year were two nearly identical accounts of *Stephanoscyphus mirabilis* (Allman 1874c, f), a supposed new order (Thecomedusae), genus, and species of Hydrozoa from "the southern shores of France." *Stephanoscyphus mirabilis* is now known to be the polyp stage of the scyphomedusa *Nausithoe punctata* Kölliker, 1853 (Werner 1973). Allman can nevertheless be credited as being first to describe a remarkable scyphistoma stage of the scyphozoan order Coronatae.

Three more reports on the biology of the hydroid *Candelabrum phrygium* appeared during 1875. Two of them (Allman 1875a, b) provided essentially identical accounts on histology and embryology of the species. The third was an abstract that summarized histological results of the same study (Allman 1875c). In addition, an expanded account of the structure and systematic affinities of *Stephanoscyphus mirabilis* was published (Allman 1875d), and its provenance was specified as Antibes, on the Mediterranean coast. Meanwhile, Allman received astonishing news that year from Wyville Thomson aboard H.M.S. *Challenger*. A "colossal" species of gymnoblastic hydroid had been discovered, on two occasions, at abyssal depths in the North Pacific Ocean. The hydranth was nine inches (23 cm) across, and its hydrocaulus measured 7 feet 4 inches (2.24 m) high. Details from Thomson's letter were published by Allman (1875e) that autumn in *Nature*. The species, later named *Monocaulus imperator* Allman, 1885a (=*Branchiocerianthus imperator*), is still the largest solitary hydroid known to science.

During 1874, the English *Transit of Venus Expeditions* had visited the Kerguelen Islands in the southern Indian Ocean, and hydroids from the expeditions were given to Allman for identification. In a preliminary account of them (Allman 1876a), one genus and seven species were briefly described as new. Four of the species names are still taken to be valid or questionably so (Appendix 2). A fuller account of the collection, together with illustrations of the species, was published later (Allman 1879b). Appearing the same year was an important taxonomic report (Allman 1876b) describing hydroids from Japan, New Zealand, Sri Lanka, Denmark, Iceland, Greenland, the British Colony of Natal (South Africa), and the northeastern North Atlantic (on gulfweed). That paper constituted a more detailed follow-up on an earlier overview of the same material (Allman 1874h). Of 33 species addressed overall in the two publications, new names were established of two genera and 10 species in the first report (Allman 1874h), and three genera and 20 species in the second (Allman 1876b). Overall, the names of two genera and 16 species are presently considered valid (Appendix 2). Other papers published that year included an exhaustive account of the structure and development of *Candelabrum phrygium* (Allman 1876c), summarized earlier (Allman 1874g, 1875a–c), and a two-paragraph statement on a collection dredged by HMS *Valorous* during a cruise to Davis Strait (Allman 1876d). In addition to many hydroids, the *Valorous* material contained an unnamed species of *Stephanoscyphus* from the North Atlantic SE of Greenland (56°11'N, 37°41'W, 1450 fathoms = 2652 m). By now entrusted with large collections from other expeditions, however, Allman published nothing more on the *Valorous* material.

Allman's (1877) report on hydroids of the Florida Straits and vicinity, and from off Cape Fear, North Carolina, represented a major advance in knowledge of the fauna inhabiting waters of the warm western North Atlantic. The specimens, collected by L.F. de Pourtalès of the United States Coast Survey, had been received for identification from Jean Louis Rodolphe Agassiz (1807–1873) of the Museum of Comparative Zoology, Harvard University. Material was preserved in "spirits," and for the most part was in excellent condition. Collections came from a virtually unexplored area that is now known to have a particularly rich hydroid fauna. Of 71 species identified in all, 64 were described as new, with most of them still valid or thought to be so. The tropical affinities of the fauna were reflected by the high number of plumularioids, accounting for 29 of the 71 species. Also described was one new family (Grammariidae, now included in Lafoeidae A. Agassiz, 1865) and seven new genera, with six of them still valid (Appendix 2). Given the extraordinary number of new taxa, it took Allman longer than anticipated to complete the manuscript. Descriptions and diagnoses in the work are less thorough than might be desired, and some illustrations lack sufficient detail for clear separation of species. Nevertheless, the publication remains a cornerstone work on hydroids of the West Atlantic Tropical Region and is still widely cited. While most of Allman's syntype specimens are in the Natural History Museum, London, this collection is in the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts. Allman did not designate holotypes for the 64 new species, or for any of the others that he described and named over his career.

Upon the return of HMS *Alert* and HMS *Discovery* to England from the British Arctic Expedition of 1875–1876 under George Strong Nares (1831–1915), Allman was given a single hydrozoan medusa to examine. He described the alcohol-preserved specimen as *Ptychogastria polaris* Allman, 1878, a new genus and species of the order Trachymedusae. Collected by expedition naturalist Henry Wemyss Feilden (1838–1921) at latitude 81°44'N in Discovery Bay, Ellesmere Island, it was the first species of hydromedusa to be reported from the Canadian Arctic. Now recognized as an Arctic circumpolar species that occasionally penetrates southward into boreal waters, medusae of *P. polaris* are unusual in being predominantly benthic in behaviour (Stübing & Piepenburg 1998).

In Presidential addresses before the Linnean Society of London during both 1878 and 1879, Allman returned to the subject of polyzoans. A paper based on the first of these presentations (Allman 1879a) provided updates on structure and development of Phylactolaemata since publication of his monograph (Allman 1857a). Over the intervening three decades, Allman's work on the group had held up well to scrutiny. Highlighted in his review were studies by Alpheus Hyatt (1838–1902) of the United States, Hinrich Nitsche (1845–1902) of Germany, and Elias Metschnikoff (Ilya Ilyich Mechnikov, 1845–1916) of Russia. Of particular importance to taxonomy, Nitsche (1869) had recognized and named two major groups within Polyzoa that are now classified as separate phyla, namely Ectoprocta (Bryozoa) and Entoprocta. The second address, in 1879, dealt with structure of Entoprocta and with that of *Hypophorella expansa* Ehlers, 1876, a ctenostome bryozoan that burrows into the tubes of polychaetes (Allman 1880a). Meanwhile, a report on hydrozoans published during 1879 provided an account of seven species collected in the Kerguelen Islands (Allman 1879b). Six of the species were described and illustrated, complementing earlier work (Allman 1876a), but no new names were introduced.

An embarassing controversy arose in 1880 over the naming of a now well-known species of freshwater hydromedusa, discovered by William Sowerby (1827–1906) in the water-lily tank at Regent's Park, London. Both Edwin Ray Lankester (1847–1929) and Allman were notified of the surprising discovery, and they proceded independently to describe and name it. Lankester's (1880a) account of the species, as *Craspedacusta sowerbii*, appeared first, on 17 June 1880. Allman (1880b) described it, as *Limnocodium victoria,* one week later in the same journal (*Nature*). A more detailed account of the species was published by Allman (1880e) later that summer. While both men were clearly unhappy about the contretemps, decorum was maintained in their published exchanges about it (Allman 1880c, d, e; Lankester 1880b, c, d, e), and disagreements centred mainly on points of medusa morphology and classification. While a compromise name, *Limnocodium sowerbii*, was contemplated by them, the binomen proposed by Lankester has nomenclatural priority and is now accepted as the valid name of the species.

Allman was assigned the formidable task of processing hydroids collected during the voyage of H.M.S. *Challenger* between 1873 and 1876. Excluded were the hydrocorals (Milleporidae and Stylasteridae), entrusted instead to Henry Nottidge Moseley (1844–1891) and John Joseph Quelch (1854–?). Given the worldwide origins and wide range of collection depths, most of the hydroid material was new to science. Work on the collection consumed much of Allman's research time over more than a decade, and results were presented in two parts. An extensive collection of Plumularioidea was dealt with in Part I (Allman 1883), with the remaining groups included

in Part II (Allman 1888). In Allman's day, all plumularioids were included in a single family, Plumulariidae McCrady, 1859 (misspelled in the report as Plumularidae).

In Part I, Allman (1883) established nine new generic names, one of them (*Lytocarpus*) being an unjustified emendation (ICZN Art. 33.2.3) of *Lytocarpia* Kirchenpauer, 1872. Of the remaining eight, two are still considered valid (Appendix 2). Another generic name (*Greeneia*) first appeared in the work (p. 7), but the name and brief account of its hydroid were based on a letter from George Busk, credited here as its author (ICZN Art. 50.1.1). Of 31 species described and beautifully illustrated in the report, 25 were thought to be new; names of 14 of them are still recognized as valid (Appendix 2). An additional species, dredged by *Challenger* off Bermuda (p. 2), had been described earlier (as *Aglaophenia ramosa* Allman, 1877) from the Florida Straits and was not discussed further. Plumularioids were generally regarded by Allman as hydroids of warm waters, varying greatly in size, and with representatives occurring over a wide bathymetric range. The deepest record was of *Cladocarpus pectiniferus* Allman, 1883, from 900 fathoms (1646 m) in the Azores. The shallowest was *Sciurella indivisa* Allman, 1883 (*Nemertesia indivisa*) from 5–10 fathoms (9–18 m) in Torres Strait. Although Allman studied each species in the collection carefully, several homonyms occurred among the new names of both genera and species (Appendix 2). Moreover, new family-group names established in the work within Plumulariidae, Eleutheroplea and Statoplea, both subdivided into the "groups" Phylactocarpa and Gymnocarpa, are unavailable nomenclaturally in not having been formed from available generic names (ICZN Art. 11.7.1.1) and have been abandoned. Notwithstanding his extraordinary productivity and experience as a taxonomist, zoological nomenclature was not one of Allman's strengths. Instead, his interests were directed more towards morphology and homology.

In a narrative of the cruise of H.M.S. *Challenger*, Allman (1885a) gave a brief description of the gigantic hydroid *Monocaulus imperator* (=*Branchiocerianthus imperator*) and included an illustration of it that had been drawn aboard ship immediately after its collection. He had earlier (Allman 1875e) reported its discovery, without naming it, and then described it more fully three years later (Allman 1888). Given the depths from which they were collected, specimens brought to the surface deteriorated rapidly, and they became grossly misshapen when placed in preservative. The illustration was therefore of immense importance in documenting its morphology. The species has since been reported from the Pacific, Indian, and Atlantic oceans, mostly at bathyal and abyssal depths (Vervoort 1966; Omori & Vervoort 1986).

While working through material from the *Challenger* Expedition, a collection of hydroids from worldwide locations but especially from Australia, New Zealand, and South Africa was received for identification from "Miss H. Gatty" (Allman 1885b). Horatia Katherine Frances Gatty (1846–1945), daughter of British author and noted collector of seaweeds Margaret Scott Gatty (1809–1873) and the Reverend Dr. Alfred Gatty (1813–1903), held a particular interest in "zoophytes" (Heleen Plaisier, personal communication, 13 February 2015). Athough all of the specimens in her collection were dry, they were otherwise in reasonably good condition. In all, 38 species were identified (Allman 1885b), with two genera and 34 species described as new (Appendix 2). Names of one genus (*Gattya*) and about eight of the species are currently recognized as valid. The bulk of Horatia Gatty's hydroid collection is now at the Weston Park Museum, Sheffield, England, with others at the Natural History Museum, London.

Allman (1888) concluded examination of hydroids from the *Challenger* Expedition with the publication of Part II of his monograph on the collection. The manuscript, received in installments between August 1887 and February 1888 (according to an editorial note by John Murray on a preliminary page), appeared later in the year during 1888 (Low and Evenhuis 2013). Encompassing groups exclusive of plumularioids, the report began with an account of hydroid morphology. A systematic section followed, with accounts of 77 species. Included were descriptions of three new families, nine new genera, and 63 new species. Thecate hydroids (73 species) were much better represented than athecates (four species). With 31 plumularioid species having been described earlier (Allman 1883), sertulariids, lafoeids, and haleciids predominated in the monograph. While a monumental work overall, taxonomic and nomenclatural shortcomings in the report were considerable. Prior to publication, five species names initially proposed by Allman were replaced because of homonymy, and more junior homonyms were discovered later (Appendix 2). The familiar genus *Sertularella* Grey, 1848, recognized for decades earlier as valid, was inadvisedly sunk in the synonymy of *Sertularia* Linnaeus, 1758. It was soon resurrected (see Marktanner-Turneretscher 1890) and has been considered valid ever since. Some descriptions and illustrations in Allman's (1888) final monograph were lacking in accuracy or in detail (Billard 1908a, b, c). Many of the species in his report were redescribed and illustrated by Billard (1910) in an examination of material at the British Museum

(Natural History Museum, London). In spite of its limitations, no single expedition has ever matched in geographic and bathymetric extent the collections brought home by *Challenger*, and many of the hydroid species reported in Allman's monograph are little-known beyond his original accounts of them.

With work on the difficult *Challenger* hydroid collection completed, Allman published nothing more on Cnidaria, nor on Ctenophora, Bryozoa, or Entoprocta. Enjoyment of his garden become a priority. His final scientific paper (Allman 1896) provided a brief account of the formation of the epiphragm of a snail (*Helix aspersa*), a species likely observed on his own property.

Honours and professional service

In 1843, Allman was elected a Member of the Royal Irish Academy (Anonymous 1901). He later became an elected fellow of several societies including the Royal College of Surgeons in Ireland (1844), the Royal Society of London (1854), the Royal Society of Edinburgh (1856), the Society of Antiquaries of Scotland (1860), and the Linnean Society of London (1872), and was the recipient of an honorary LL.D. degree from the University of Edinburgh in 1873 (Boase 1908). He was a recipient of the Royal Medal of the Royal Society (1873), the Brisbane Prize of the Royal Society of Edinburgh (1873), the Cunningham Medal of the Royal Irish Academy (1878), and the Gold Medal of the Linnean Society (1896). Immediately after arriving in Scotland in 1855, Allman was appointed a Commissioner of Scottish Fisheries. Those duties continued until 1881, when the department was disbanded (Howes 1898; M'Intosh 1899). During 1860, Allman was President of the Botanical Society of Edinburgh. An active member of the British Association for the Advancement of Science for several decades, he served as President of its Biological Section in 1873 and as President of the entire society in 1879 (Boase 1908). On leaving the University of Edinburgh, he was appointed Emeritus Professor of Natural History. Allman succeeded the noted botanist George Bentham (1800–1884) as President of the Linnean Society of London in 1874, and served until 1881, when he was replaced by the polymath Sir John Lubbock (1834–1930). In 1876 he was appointed a commissioner to investigate operations of the Queen's Colleges in Ireland (Howes 1898).

Names of the following two genera and 22 species have been established in honour of Allman: *Hydrallmania* Hincks, 1868 [Hydrozoa]; *Allmaniella* M'Intosh, 1885 [Polychaeta]; *Haematococcus allmani* Hassall, 1845 [Chlorophyceae]; *Corynactis allmani* Thompson, 1846 [Anthozoa]; *Plumatella allmani* Hancock, 1850 [Bryozoa]; *Pinnularia allmaniana* Gregory, 1857 [Bacillariophyceae]; *Crangon allmanni* (sic) Kinahan, 1860 [Crustacea]; *Notodelphys allmanni* (sic) Thorell, 1860 [Crustacea]; *Loxomma allmanni* (sic) Huxley, 1862 [Amphibia]; *Edwardsia allmanni* (sic) M'Intosh, 1866 [Anthozoa]; *Thysanozoon allmani* Collingwood, 1876 [Platyhelminthes]; *Bougainvillea* (sic) *allmanii* Romanes, 1877 [Hydrozoa]; *Selaginopsis allmani* Norman, 1878 [Hydrozoa]; *Antennella allmanni* (sic) Armstrong, 1879 [Hydrozoa]; *Cladonema radiatum allmani* Haeckel, 1879 [Hydrozoa]; *Calypterinus allmani* Wright & Studer, 1889 [Anthozoa]; *Halicornaria allmanii* Marktanner-Turneretscher, 1890 [Hydrozoa]; *Stephanoscyphus allmani* Kirkpatrick, 1890 [Scyphozoa]; *Hydractinia allmanii* Bonnevie, 1898 [Hydrozoa]; *Aglaophenia allmani* Nutting, 1900 [Hydrozoa]; *Sertularella allmani* Hartlaub, 1901 [Hydrozoa]; *Diplocheilus allmani* Torrey, 1904 [Hydrozoa]; *Sertularella gayi* var. *allmani* Billard, 1910 [Hydrozoa]; *Buddenbrockia allmani* Canning, Curry, Hill, & Okamura, 2007 [Myxozoa].

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lithograph of a young Allman reproduced here was granted by the National Portrait Gallery, London, and use of the photograph of Allman was granted by The Royal Society. Natalie Barnes of the Ray Society assisted in determining the publication date of Allman's monograph on freshwater Bryozoa. Dr. Bernadette Cunningham of the Royal Irish Academy (RIA), Dublin, provided information on frequency of publication of parts of volumes in the *Proceedings of the RIA* during the mid-19th century. Elaine Charwat of the Linnean Society of London responded to a request for information on Allman in archives of the society.

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APPENDIX 1. Names established within Bryozoa and Entoprocta by George James Allman. The abbreviation "A" refers to "Allman;" asterisks indicate names that are currently taken to be valid.

Bryozoa
Classes
*Gymnolaemata A, 1857a: 10
*Phylactolaemata A, 1857a: 10

Suborders
Lophopea A, 1857a: 10
* Paludicellina A, 1857a: 10 (as Paludicellea)

Families
*Cristatellidae A, 1851a: 306
*Plumatellidae A, 1851a: 306
*Paludicellidae A, 1844a: 331 (as Paludicellaidæ)

Species: Original Spelling	**Type Locality**	**Current Name**
**Plumatella emarginata* A, 1844a: 330	Ireland: fresh waters	*Plumatella emarginata* A, 1844a
**Plumatella fruticosa* A, 1844a: 331	Ireland: fresh waters	*Plumatella fruticosa* A, 1844a
Fredericella dilatata A, 1844a: 331	Ireland: fresh waters	*Fredericella sultana* (Blumenbach, 1779)
Alcyonella benedeni A, 1851a: 330	England: Essex, River Chelmer[1]	*Plumatella emarginata* A, 1844a
**Plumatella stricta* A, 1851a: 335[2]	Belgium: Brussels; Leuven	*Plumatella stricta* A, 1851a
Plumatella coralloides A, 1851a: 335	England: Thames R, London Docks[3]	*Plumatella fungosa* (Pallas, 1768)
Plumatella elegans A, 1851a: 336	Ireland: Co. Cork, Bandon Millpond[4]	*Plumatella repens* (Linnaeus, 1758)
Plumatella dumortieri A, 1851a: 336	England: Essex, Crix[5]	*Plumatella repens* (Linnaeus, 1758)
Plumatella jugalis A, 1851a: 336	England: Essex, Little Baddow[6]	*Plumatella emarginata* A, 1844a

Entoprocta
Suborders
Pedicellinea A, 1857a: 10
Urnatellea A, 1857a: 10

Family
*Urnatellidae A, 1857a[7]: 76

Nomenclatural Notes
[1] While the locality was given only as "England" in the original description, the type locality was more precisely identified in Allman (1857a: 90).

[2] *Plumatella stricta* Allman, 1851a was a nomen novum for *Plumatella repens* sensu Van Beneden, 1848 (not *P. repens* Linnaeus, 1758).

[3] For details on type locality, see Allman (1857a: 103).

[4] For details on type locality, see Allman (1857a: 107).

[5] For details on type locality, see Allman (1857a: 108). Crix, Hatfield Peveral, Essex, was the estate of Samuel Shaen (1783–1854), father-in-law of George James Allman.

[6] For details on type locality, see Allman (1857a: 108).

[7] The family names Urnatellidae Allman, 1857a and Barentsiidae Emschermann, 1972 are sometimes taken to be synonyms. When so considered, the older name established by Allman, in use over a span of some 150 years, has priority. Reversal of Precedence provisions, by which a junior name might be assigned precedence over its senior synonym, are not met in this case (see ICZN Article 23.9). With respect to Article 23.9.1.1. of the code, the name Urnatellidae has been used several times as a valid name since 1899, with the four following references cited merely as examples (e.g. Rogick 1959: 499; Nielsen 1964: 52; King *et al*. 1988: 355; Barnes & Lauer 2003: 32). ICZN Art. 35.5 is sometimes cited as justification for retaining Barentsiidae over Urnatellidae, but provisions of that article are not met in this case. Urnatellidae remains a valid name.

APPENDIX 2. Names established within Cnidaria by George James Allman. The abbreviation "A" refers to "Allman;" asterisks indicate names that are currently taken to be valid.

Orders (including suborders)
Hydrozoa
Gymnoblastea A, 1871c:189
Calyptoblastea A, 1871c:189
Eleutheroblastea A, 1871c:189
Monopsea A, 1871c:189
Thalamophora A, 1888:lii

Scyphozoa
Thecomedusae A, 1874c:271

Families
Hydrozoa
*Hydridae A, 1844a:330 (as Hydraidæ)
Podocorynidae A, 1864b:353
Laridae A, 1864b:355
Clavatellidae A, 1864b:361
Dicorynidae A, 1864b:366
Leptoscyphidae A, 1864b:378
*Lineolariidae A, 1864b:379 (as Lineolaridae)
Turridae A, 1872h:259
Syncorynidae A, 1872h:274
Bimeriidae A, 1872h:294 (as Bimeridae)
*Cladocorynidae A, 1872h:379
*Corymorphidae A, 1872h:386
Monocaulidae A, 1872h:395
Hybocodonidae A, 1872h:421
Hydrolaridae A, 1872h:424
Thuiariidae A, 1874b:472 (as Thuiaridae)
Grammariidae A, 1877:17 (as Grammaridae)
Eleutheroplea A, 1883:3 (family-group within Plumularioidea McCrady, 1859)
Statoplea A, 1883:3 (family-group within Plumularioidea McCrady, 1859)
Perisiphoniidae A, 1888:32 (as Perisiphonidae)
Idiidae A, 1888:82
*Protohydridae A, 1888:liii

Genera

Hydrozoa	**Type Species**	**Type Fixation**
**Cordylophora* A, 1843b:395	*Cordylophora lacustris* A, 1843b	by monotypy
Manicella A, 1859c:51	*Manicella fusca* A, 1859c	by monotypy
Corythamnium A, 1859c:54	*Eudendrium bacciferum* A, 1859c	by monotypy
**Dicoryne* A, 1859f:370	*Dicoryne stricta* A, 1859f	by monotypy
Corymbogonium A, 1861:171	*Eudendrium capillare* Alder, 1856a	by monotypy
Tubiclava A, 1863a:9	*Tubiclava lucerna* A, 1863a	by monotypy
Campaniclava A, 1864b:351	*Syncoryne cleodorae* Gegenbaur, 1854	by monotypy
Stylactis A, 1864b:353	*Stylactis fucicola* M. Sars, 1857	by subsequent designation by Mayer (1910a)
Corynopsis A, 1864b:353	*Podocoryne alderi* Hodge, 1861	by monotypy
Rhizocline A, 1864b:355	*Hydractinia areolata* Alder, 1862a	by monotypy
Heteractis A, 1864b:359	*Corymorpha annulicornis* Sars, 1860	by monotypy
Heterocordyle A, 1864b:365	*Heterocordyle conybearei* A, 1864b	by monotypy
Monocaulos A, 1864b:370[1]	*Corymorpha glacialis* M. Sars, 1860	by subsequent designation by Svoboda & Stepanjants (2001)[1]
**Gonothyraea* A, 1864b:374	*Laomedea loveni* A, 1859d	by subsequent designation by Apstein (1915)
Hypsorophus A, 1864b:376[2]	*Campanulina repens* A, 1864b	by monotypy
Leptoscyphus A, 1864b:378	*Laomedea tenuis* A, 1859f	by monotypy
Heterostephanus A, 1864c:62[3]	*Corymorpha annulicornis* Sars, 1860	automatic fixation
Schizocladium A, 1871a:18	*Schizocladium ramosum* A, 1871a	by monotypy
Actinogonium A, 1872h:272[4]	*Actinogonium pusillum* A, 1872h	by monotypy
Wrightia A, 1872h:298[5]	*Atractylis arenosa* Alder, 1862b	by monotypy
Halocordyle A, 1872h:368	*Globiceps tiarella* Ayres, 1852	by monotypy
Halatractus A, 1872h:390[6]	*Corymorpha nana* Alder, 1857	by monotypy
Monocaulus A, 1872h:395[1]	*Corymorpha glacialis* M. Sars, 1860	automatic fixation
**Synthecium* A, 1872h:229	*Synthecium elegans* A, 1872h	by original designation
Statocodium A, 1872h:279	none fixed	
Ametrangia A, 1873g:73	*Ametrangia hemispherica* A, 1873g	by original designation
Halicornaria A, 1874b:476[7]	*Halicornaria ramulifera* A, 1874b	by subsequent designation by Vervoort (1966)

**Cladocarpus* A, 1874b:477	*Cladocarpus formosus* A, 1874b	by monotypy
Diplopteron A, 1874b:479[8]	*Diplopteron insigne* A, 1874b	by monotypy
Gemminella A, 1874h:179	no included species	
Taxella A, 1874h:179	*Taxella eximia* A, 1874h	by monotypy
Hypanthea A, 1876a:115	*Hypanthea repens* A, 1876a	by original designation
Desmoscyphus A, 1876b:264	*Desmoscyphus buskii* A, 1876b	by monotypy
**Selaginopsis* A, 1876b:272	*Selaginopsis fusca* A, 1876b	by monotypy
**Pericladium* A, 1876b:273	*Pericladium bidentatum* A, 1876b	by monotypy
**Thyroscyphus* A, 1877:10	*Thyroscyphus ramosus* A, 1877	by monotypy
**Oplorhiza* A, 1877:14	*Oplorhiza parvula* A, 1877	by monotypy
**Halopteris* A, 1877:32	*Halopteris carinata* A, 1877	by monotypy
Antennopsis A, 1877:34	*Antennopsis hippuris* A, 1877	by monotypy
**Hippurella* A, 1877:35	*Hippurella annulata* A, 1877	by monotypy
**Monostaechas* A, 1877:36	*Monostaechas dichotoma* A, 1877	by monotypy
**Antennella* A, 1877:38[9]	*Antennella gracilis* A, 1877	by subsequent designation by Millard (1962)
**Ptychogastria* A, 1878:292	*Ptychogastria polaris* A, 1878	by monotypy
Limnocodium A, 1880:178	*Limnocodium victoria* A, 1880	by monotypy
Sciurella A, 1883:25	*Sciurella indivisa* A, 1883	by monotypy
Acanthella A, 1883:27[10]	*Plumularia effusa* Busk, 1852	by monotypy
**Schizotricha* A, 1883:28	*Schizotricha unifurcata* A, 1883	by subsequent designation by Totton (1930)
Heteroplon A, 1883:31	*Heteroplon pluma* A, 1883	by monotypy
Acanthocladium A, 1883:32	*Plumularia huxleyi* Busk, 1852	by monotypy
Lytocarpus A, 1883:40[11]	*Sertularia myriophyllum* Linnaeus, 1758	automatic fixation
**Streptocaulus* A, 1883:48	*Streptocaulus pulcherrimus* A, 1883	by monotypy
Diplocheilus A, 1883:48[12]	*Diplocheilus mirabilis* A, 1883	by monotypy
Azygoplon A, 1883:53	*Azygoplon rostratum* A, 1883	by monotypy
Thecocladium A, 1885b:149	*Thecocladium flabellum* A, 1885b	by monotypy
**Gattya* A, 1885b:155	*Gattya humilis* A, 1885b	by monotypy
Diplocyathus A, 1888:16	*Diplocyathus dichotomus* A, 1888	by monotypy
Calamphora A, 1888:28	*Calamphora parvula* A, 1888	by monotypy
**Hebella* A, 1888:29	*Hebella striata* A, 1888	by monotypy
**Halisiphonia* A, 1888:30	*Halisiphonia megalotheca* A, 1888	by monotypy
Lictorella A, 1888:35	*Lictorella halecioides* sensu Allman, 1888[13]	by subsequent designation by Totton (1930)
Perisiphonia A, 1888:43	*Perisiphonia pectinata* Allman, 1888	by subsequent designation by Totton (1930)
Hypopyxis A, 1888:74	*Hypopyxis labrosa* A, 1888	by monotypy
Staurotheca A, 1888:75	*Staurotheca dichotoma* A, 1888	by monotypy
Dictyocladium A, 1888:76	*Dictyocladium dichotomum* Allman, 1888	by monotypy

Scyphozoa	**Type Species**	**Type Fixation**
Stephanoscyphus Allman, 1874c:271	*Stephanoscyphus mirabilis* Allman, 1874c	by monotypy

Staurozoa	**Type Species**	**Type Fixation**
Carduella A, 1860a:125	*Lucernaria cyathiformis* M. Sars, 1846[14]	by monotypy

Anthozoa	**Type Species**	**Type Fixation**
**Corynactis* A, 1846a:417	*Corynactis viridis* A, 1846a	by monotypy

Species: Original Spelling	**Type Locality**	**Current Name**
Hydrozoa		
Cordylophora lacustris A, 1843b:395	Ireland: Dublin, Grand Canal	*Cordylophora caspia* (Pallas, 1771)
Manicella fusca A, 1859c:51	Scotland: Firth of Forth	*Bimeria vestita* Wright, 1859a
Eudendrium bacciferum A, 1859c:52[15]	Scotland: Firth of Forth	*Garveia nutans* Wright, 1859
Coryne briareus A, 1859c:54	Scotland: Firth of Forth	*Zanclea implexa* (Alder, 1856b)
**Laomedea loveni* A, 1859d:138	Scotland: Firth of Forth, Cramond Is.	*Gonothyraea loveni* (A, 1859d)
**Coryne eximia* A, 1859d:141	Scotland: Firth of Forth	*Coryne eximia* A, 1859d
Laomedea tenuis A, 1859f:367	Scotland: Orkney, off Stromness	*Phialella quadrata* (Forbes, 1848)
Clava discreta A, 1859f:369	Scotland: Orkney	*Clava multicornis* (Forsskål, 1775)
Dicoryne stricta A, 1859f:369	Scotland: Orkney	*Dicoryne conferta* (Alder, 1856a)
Clava diffusa A, 1863a:8	Scotland: Shetland, Out Skerries	*Clava multicornis* (Forsskål, 1775)
Tubiclava lucerna A, 1863a:9	England: Torquay; Ireland: Dublin Bay	nomen dubium
Eudendrium humile A, 1863a:9	England: Torquay	*Eudendrium ramosum* (Linnaeus, 1758)
Eudendrium humile var. *corymbifera* A, 1863a:10	England: Torquay	*Eudendrium ramosum* (Linnaeus, 1758)
**Eudendrium vaginatum* A, 1863a:10	Scotland: Shetland	*Eudendrium vaginatum* A, 1863a
Perigonymus serpens A, 1863a:10	England: Torbay	*Amphinema dinema* (Péron & Lesueur, 1810)
Perigonymus minutus A, 1863a:11	Scotland: Shetland, Busta Voe	*Leuckartiara octona* (Fleming, 1823)
**Perigonymus muscus* A, 1863a:12	England: Torquay	*Bougainvillia muscus* (A, 1863a)
Tubularia bellis A, 1863a:12	Scotland: Shetland	*Ectopleura larynx* (Ellis & Solander, 1786)
Stylactis sarsii A, 1864b:353[16]	Norway	*Hydractinia sarsii* (Steenstrup, 1850)

**Heterocordyle conybearei* A, 1864b:365	Ireland: Cork, Glengarriff Harbour	*Dicoryne conybearei* (A, 1864b)
Campanulina repens A, 1864b:376	Scotland: Firth of Forth	*Phialella quadrata* (Forbes, 1848)
Perigonimus vestitus A, 1864c:57	Scotland: Firth of Forth	*Leuckartiara octona* (Fleming, 1823)
Bougainvillia fruticosa A, 1864c:58	Ireland: Kerry, Kenmare River	*Bougainvillia muscus* (A, 1863a)
Tubularia humilis A, 1864c:60	Ireland: Cork, Kinsale Harbour	*Ectopleura larynx* (Ellis & Solander, 1786)
Tubularia attenuata A, 1864c:60	Scotland: Firth of Forth, and Shetland	*Ectopleura larynx* (Ellis & Solander, 1786)
Syncoryne pulchella A, 1865b:465	Scotland: Firth of Clyde, Skelmorlie	?*Sarsia tubulosa* (M. Sars, 1835)
Coryne nutans A, 1869a:323	Scotland: Shetland, Burrafirth	nomen dubium
Schizocladium ramosum A, 1871a:18	Scotland: Loch Long	*Obelia dichotoma* (Linnaeus, 1758)
**Hydractinia pliocena* A, 1872e:338 [fossil]	England: East Anglia, Coralline Crag	*Hydractinia pliocena* A, 1872e
**Synthecium elegans* A, 1872h:229	New Zealand	*Synthecium elegans* A, 1872h
Tubiclava fruticosa A, 1872h:257	Wales: Tenby	?*Turritopsis polycirrha* (Keferstein, 1862)
**Coryne caespes* A, 1872h:270	Italy: Golfo della Spezia	*Coryne caespes* A, 1872h **(?)**
Actinogonium pusillum A, 1872h:273	Belgium: Côte d'Ostende	*Coryne vanbenedenii* Hincks, 1868
Syncoryne frutescens A, 1872h:281	Ireland: Dublin, Kingstown	?*Sarsia tubulosa* (M. Sars, 1835)
**Stylactis inermis* A, 1872h:305	France: Nice	*Stylactaria inermis* (A, 1872h)
Tubularia insignis A, 1872h:405	France: Dieppe	?*Tubularia indivisa* Linnaeus, 1758
Tubularia polycarpa A, 1872h:413	Chile: Coquimbo	?*Ectopleura crocea* (L. Agassiz, 1862)
Tubularia pacifica A, 1872h:416[17]	USA: San Francisco	nomen dubium
Tubularia mesembryanthemum A, 1872h:418	Italy: Golfo della Spezia	*Ectopleura crocea* (L. Agassiz, 1862)
Tubularia aspera A, 1872h:420	Chile: Coquimbo	nomen dubium
Ametrangia hemispherica A, 1873g:73	Ireland: south coast	*Dipleurosoma typicum* Boeck, 1866
Circe invertens A, 1873g:74	Ireland: south coast	*Aglantha digitale* (O.F. Müller, 1776)
Lafoea halecioides A, 1874b:472	Faroe-Shetland Trough	nomen dubium
**Thuiaria laxa* A, 1874b:472	Faroe-Shetland Trough	*Thuiaria laxa* A, 1874b
**Thuiaria hippuris* Allman, 1874b: 473	Faroe-Shetland Trough	*Thuiaria hippuris* A, 1874b
Thuiaria salicornia A, 1874b:73	Faroe Islands	*Abietinaria fusca* (Johnston, 1847)
Diphasia coronifera A, 1874b:474	Faroe-Shetland Trough	*Diphasia fallax* (Johnston, 1847)
Sertularella gayi var. *robusta* A, 1874b:474	Faroe-Shetland Trough	*Sertularella gayi (*Lamouroux, 1821)
**Aglaophenia dromaius* A, 1874b:475	Slope, S of Little Sole Bank	*Aglaophenia dromaius* A, 1874b
Aglaophenia elongata A, 1874b:476[18]	Slope, S of Little Sole Bank	*Aglaophenia longa* Stechow, 1921
**Halicornaria ramulifera* A, 1874b:477	Faroe-Shetland Trough	*Nematocarpus ramuliferus* (A, 1874b)
**Cladocarpus formosus* A, 1874b:478	Faroes; Faroe-Shetland Trough	*Cladocarpus formosus* A, 1874b
Diplopteron insigne A, 1874b:479	Portugal: SW of Cabo de Santa Maria	*Polyplumaria flabellata* G.O. Sars, 1874
**Hydractinia monocarpa* A, 1874h:179	Spitzbergen	*Hydractinia monocarpa* A, 1874h
Cladocoryne pelagica A, 1874h: 179	57°N, 13°W, on gulfweed	*Cladocoryne floccosa* Rotch, 1871
Amalthaea islandica A, 1874h:179	Iceland	*Corymorpha glacialis* M. Sars, 1860
**Campanularia grandis* A, 1874h:179	Japan	*Bonneviella grandis* (A, 1874h)
**Thuiaria coronata* A, 1874h:179	Japan	*Salacia coronata* (A, 1874h)
**Sertularella episcopus* A, 1874h:179	New Zealand	*Amphisbetia episcopus* (A, 1874h)
Thuiaria cerastium A, 1874h:179	New Zealand: North Island	*Dictyocladium monilifer* (Hutton, 1873)
**Makrorhynchia insignis* A, 1874h:179	Sri Lanka	*Gymnangium insigne* (A, 1874h)
**Taxella eximia* A, 1874h:179	Sri Lanka	*Gymnangium eximium* (A, 1874h)
Sertularia arctica A, 1874h:179	Spitzbergen	*Sertularia tenera* G.O. Sars, 1874
Sertularella kerguelenensis A, 1876a:113	Kerguelen Is.: Baie des Swains	species inquirenda
**Sertularella unilateralis* A, 1876a:114	Kerguelen Is.: Baie des Swains	*Sertularella unilateralis* A, 1876a
**Sertularella lagena* A, 1876a:114	Kerguelen Is.: Baie de l'Observatoire; Golfe de Morbihan	*Sertularella lagena* A, 1876a
**Halecium mutilum* A, 1876a: 114	Kerguelen Is.: Baie de l'Observatoire	*Halecium mutilum* A, 1876a
**Campanularia cylindrica* A, 1876a:114	Kerguelen Is.: Baie des Swains	*Campanularia cylindrica* A, 1876a
Hypanthea repens A, 1876a:115	Kerguelen Is.: Baie des Swains	*Silicularia rosea* Meyen, 1834
Coryne conferta Allman, 1876a:115	Kerguelen Is.: Baie de l'Observatoire	nomen dubium
Perigonimus multicornis A, 1876b:252	unknown (see Schuchert 2008)	*Myrionema hargitti* (Congdon, 1906)
Eudendrium rigidum A, 1876b:253	Denmark	*Eudendrium arbuscula* Wright, 1859a
Podocoryne inermis A, 1876b:255	Denmark: Øresund; Middelfart	*Podocoryna carnea* M. Sars, 1846
**Monocaulus groenlandica* A, 1876b:257	Greenland	*Corymorpha groenlandica* (A, 1876b)
**Campanularia crenata* A, 1876b:258	Japan	*Tulpa crenata* (A, 1876b)
**Campanularia gracilis* A, 1876b:260	Japan	*Campanularia gracilis* A, 1876b
**Campanularia juncea* A, 1876b:260	Sri Lanka	*Thyroscyphus junceus* (A, 1876b)
**Sertularella integra* A, 1876b:262	New Zealand	*Sertularella integra* A, 1876b
Desmoscyphus buskii A, 1876b:265	New Zealand	*Salacia bicalycula* (Coughtrey, 1876)
**Thuiaria crassicaulis* A, 1876b:267	Japan	*Sertularia crassicaulis* (A, 1876b)
Thuiaria coronifera A, 1876b:268	Japan	*Salacia coronata* (A, 1874h)
Thuiaria bidens A, 1876b:269	New Zealand	*Symplectoscyphus subarticulatus* (Coughtrey, 1875)
Thuiaria dolichocarpa A, 1876b:270	New Zealand: North Island	*Crateritheca zelandica* (Gray, 1843)
Thuiaria persocialis A, 1876b:271	Natal (South Africa)	*Thuiaria articulata* (Pallas, 1766)
Selaginopsis fusca A, 1876b:272[19]	Japan	*Selaginopsis allmani* Norman, 1878
**Pericladium bidentatum* A, 1876b:273	Japan	*Pericladium bidentatum* A, 1876b
**Aglaophenia acanthocarpa* A, 1876b:274	New Zealand	*Aglaophenia acanthocarpa* A, 1876b

**Aglaophenia laxa* A, 1876b:275	New Zealand	*Aglaophenia laxa* A, 1876b
**Halicornaria saccaria* A, 1876b:277	Sri Lanka	*Gymnangium saccarium* (A, 1876b)
Halicornaria bipinnata A, 1876b:279	Sri Lanka	*Gymnangium eximium* A, 1874h
**Eudendrium eximium* A, 1877:5	USA: FL, Florida Reef	*Eudendrium eximium* A, 1877
**Eudendrium exiguum* A, 1877:6	USA: FL, Florida Reef	*Eudendrium exiguum* A, 1877
**Eudendrium fruticosum* A, 1877:6	USA: FL, Key West	*Eudendrium fruticosum* A, 1877
Eudendrium attenuatum A, 1877:6	USA: FL, SSW of Tortugas	nomen dubium
**Eudendrium laxum* A, 1877:7	USA: FL, Sand Key	*Eudendrium laxum* A, 1877
**Eudendrium gracile* A, 1877:7	USA: FL, Double-Headed Shot Key	*Eudendrium gracile* A, 1877
Eudendrium tenellum A, 1877:8	USA: FL, Double-Headed Shot Key	nomen dubium
**Eudendrium cochleatum* A, 1877:8	USA: NC, off Cape Fear River	*Eudendrium cochleatum* A, 1877
Bimeria humilis A, 1877:8	USA: FL, Tortugas	*Bimeria vestita* Wright, 1859a
**Obelia marginata* A, 1877:9	USA: FL, Loggerhead Key	*Thyroscyphus marginatus* (A, 1877)
**Obelia longicyatha* A, 1877:10	USA: FL, Florida Reef	*Obelia longicyatha* A, 1877
**Thyroscyphus ramosus* A, 1877:11	USA: FL, S of Sand Key	*Thyroscyphus ramosus* A, 1877
**Campanularia macroscypha* A, 1877:11	USA: FL, Sand Key	*Campanularia macroscypha* A, 1877
**Lafoea venusta* A, 1877:11	USA: FL, Loggerhead Key	*Hebella venusta* (A, 1877)
**Lafoea tenellula* A, 1877:12	USA: FL, S of Marquesas	*Lafoea tenellula* A, 1877
**Lafoea convallaria* A, 1877:12	USA: FL, Florida Reef	*Zygophylax convallaria* (A, 1877)
**Lafoea coalescens* A, 1877:13	USA: FL, S of Marquesas	*Lafoea coalescens* A, 1877
**Cuspidella pedunculata* A, 1877:13	USA: FL, S of Tortugas	*Eucuspidella pedunculata* (A, 1877)
**Oplorhiza parvula* A, 1877:15	USA: FL, S of Marquesas	*Oplorhiza parvula* A, 1877
**Halecium filicula* A, 1877:15	USA: FL, S of Marquesas	*Halecium filicula* A, 1877
**Halecium macrocephalum* A, 1877:16	USA: FL, Sand Key	*Halecium macrocephalum* A, 1877
**Cryptolaria conferta* A, 1877:17	Cuba: Cojima (Cojimar)	*Acryptolaria conferta* (A, 1877)
**Cryptolaria longitheca* A, 1877:19	USA: FL, Double-Headed Shot Key	*Acryptolaria longitheca* (A, 1877)
**Cryptolaria abies* A, 1877:20	location unknown	*Acryptolaria abies* (A, 1877)
**Cryptolaria elegans* A, 1877:20	USA: FL, Florida Reef	*Acryptolaria elegans* (A, 1877)
**Sertularella conica* A, 1877:21	USA: FL, SW of Tortugas	*Sertularella conica* A, 1877
**Sertularella amphorifera* A, 1877:22	USA: FL, Double-Headed Shot Key	*Symplectoscyphus amphoriferus* (A, 1877)
**Sertularia marginata* A, 1877:23	USA: FL, Florida Reef	*Synthecium marginatum* (A, 1877)
**Sertularia tumida* A, 1877:23	USA: FL, Tortugas	*Tridentata tumida* (A, 1877)
**Sertularia tubitheca* A, 1877:24	USA: FL, Tortugas	*Synthecium tubithecum* (A, 1877)
Sertularia exigua A, 1877:24	USA: NC, off Cape Fear	*Dynamena disticha* (Bosc, 1802)
Sertularia distans A, 1877:25	USA: FL, Tennessee Reef	*Dynamena disticha* (Bosc, 1802)
Desmoscyphus longitheca A, 1877:26	USA: FL, Key West	*Diphasia digitalis* (Busk, 1852)
Thuiaria distans A, 1877:27[20]	USA: FL, Tortugas	*Sertularella diaphana* (A, 1885)
**Thuiaria plumulifera* A, 1877:27	USA: NC, off Cape Fear	*Sertularia plumulifera* (A, 1877)
Thuiaria pinnata A, 1877:28[21]	USA: FL, Double-Headed Shot Key	*Sertularella diaphana* (A, 1885)
Thuiaria sertularioides A, 1877:28[22]	location unknown	*Dynamena dalmasi* (Versluys, 1899)
**Plumularia filicula* A, 1877:29	USA: FL, Alligator Reef	*Plumularia filicula* A, 1877
**Plumularia macrotheca* A, 1877:30	Cuba: Cojima (Cojimar)	*Plumularia macrotheca* A, 1877
**Plumularia attenuata* A, 1877:30	USA: FL, off Boca Grande	*Plumularia attenuata* A, 1877
**Plumularia megalocephala* A, 1877:31	USA: FL, Alligator Reef	*Plumularia megalocephala* A, 1877
**Plumularia geminata* A, 1877:32	USA: FL, Sand Key	*Halopteris geminata* (A, 1877)
**Halopteris carinata* A, 1877:33	USA: FL, Carysfort Reef	*Halopteris carinata* A, 1877
**Antennularia simplex* A, 1877:34	USA: FL, Alligator Reef	*Nemertesia simplex* (A, 1877)
**Antennopsis hippuris* A, 1877:35	USA: FL, Double-Headed Shot Key	*Nemertesia hippuris* (A, 1877)
**Hippurella annulata* A, 1877:36	USA: FL, Pacific Reef	*Hippurella annulata* A, 1877
Monostaechas dichotoma A, 1877:37	USA: FL, Pacific Reef	*Monostaechas quadridens* (McCrady, 1859)
**Antennella gracilis* A, 1877:38	USA: FL, Carysfort Reef	*Antennella gracilis* A, 1877
Aglaophenia ramosa A, 1877:39[23]	USA: FL, Florida Reef	*Macrorhynchia allmani* Nutting, 1900
**Aglaophenia rhynchocarpa* A, 1877:40	USA: FL, Key West, Triangle Shoal	*Aglaophenia rhynchocarpa* A, 1877
Aglaophenia lophocarpa A, 1877:41[24]	USA: FL, Tortugas	*Aglaophenia apocarpa* A, 1877
**Aglaophenia apocarpa* A, 1877:41[24]	USA: FL, Sand Key	*Aglaophenia apocarpa* A, 1877
Aglaophenia gracilis A, 1877:42[25]	USA: FL, Carysfort Reef	*Aglaophenia dubia* Nutting, 1900
Aglaophenia rigida A, 1877:43	USA: NC, off Cape Fear	*Aglaophenia trifida* L. Agassiz, 1862
**Aglaophenia distans* A, 1877:44	USA: FL, Pacific Reef	*Lytocarpia distans* (A, 1877)
**Aglaophenia sigma* A, 1877:45	USA: FL, Alligator Reef	*Cladocarpus sigma* (A, 1877)
**Aglaophenia bispinosa* A, 1877:46	USA: FL, Alligator & Tennessee reefs	*Lytocarpia bispinosa* (A, 1877)
Aglaophenia constricta A, 1877:47	USA: FL, Conch Reef	*Gymnangium speciosum* (A, 1877)
Aglaophenia perpusilla A, 1877:48[26]	USA: FL, The Quicksands	*Aglaophenia latecarinata* A, 1877
**Cladocarpus dolichotheca* A, 1877:50	USA: FL, Pacific Reef	*Cladocarpus dolichotheca* A, 1877
**Cladocarpus ventricosus* A, 1877:52	USA: FL, Sand Key	*Cladocarpus ventricosus* A, 1877
**Cladocarpus paradisea* A, 1877:53	USA: FL, Tennessee & Samboes reefs	*Cladocarpus paradiseus* A, 1877
**Halicornaria speciosa* A, 1877:54	USA: FL, Double-Headed Shot Key	*Gymnangium speciosum* (A, 1877)
**Aglaophenia late-carinata* A, 1877:56	USA: Gulf of Mexico, on *Sargassum*	*Aglaophenia latecarinata* A, 1877
**Ptychogastria polaris* A, 1878:290	Canada: Ellesmere Is., Discovery Bay	*Ptychogastria polaris* A, 1878
Limnocodium victoria A, 1880b: 178	England: London, Regent's Park	*Craspedacusta sowerbii* Lankester, 1880

Plumularia flabellum A, 1883:19[27]	South Africa: Marion Island	*Plumularia insignis* A, 1883
Plumularia laxa A, 1883:19	Australia: 36°56'S, 150° 30'E	*Halopteris campanula* Busk, 1852
**Plumularia dolichotheca* A, 1883:20	Philippines: Zamboanga	*Plumularia dolichotheca* A, 1883
**Plumularia insignis* A, 1883:21	South Africa: Prince Edward Island	*Plumularia insignis* A, 1883
Plumularia abietina A, 1883:21[27]	South Africa: Prince Edward Island	*Plumularia insignis* A, 1883
**Plumularia stylifera* A, 1883:22[28]	Tristan da Cunha	*Halopteris* (?) *stylifera* (A, 1883)
Plumularia armata A, 1883:22	Australia: off Port Jackson	*Halopteris glutinosa* (Lamouroux, 1816)
**Antennularia fascicularis* A, 1883:24	Tristan da Cunha: off Nightingale Is.	*Corhiza fascicularis* (A, 1883)
**Sciurella indivisa* A, 1883	Australia: Cape York, Somerset Is.	*Nemertesia indivisa* (A, 1883)
**Schizotricha unifurcata* A, 1883:28	Kerguelen: Christmas Harbour	*Schizotricha unifurcata* A, 1883
**Schizotricha multifurcata* A, 1883:29	Heard Island	*Schizotricha multifurcata* A, 1883
Polyplumaria pumila A, 1883:31	Portugal: Azores	*Polyplumaria flabellata* G.O. Sars, 1874
Heteroplon pluma A, 1883:32	Australia: off East Moncoeur Is.	*Halopteris glutinosa* (Lamouroux, 1816)
Aglaophenia filicula A, 1883:36	Portugal: Azores	*Aglaophenia tubulifera* (Hincks, 1861)
Aglaophenia attenuata A, 1883:37	South Africa: Simon's Bay	nomen dubium
**Aglaophenia acacia* A, 1883:38	Portugal: Azores	*Aglaophenia acacia* A, 1883
Aglaophenia calamus A, 1883:39	Brazil: Bahia	nomen dubium
**Aglaophenia coarctata* A, 1883:39	Philippines: off Zamboanga	*Aglaophenia coarctata* A, 1883
**Lytocarpus racemiferus* A, 1883:41	Brazil: Bahia	*Macrorhynchia racemifera* (A, 1883)
**Lytocarpus spectabilis* A, 1883:43	Philippines: off Zamboanga; Australia: Torres Strait	*Macrorhynchia spectabilis* (A, 1883) *Macrorhynchia spectabilis* (A, 1883)
**Streptocaulus pulcherrimus* A, 1883:48	Cape Verde Is.: Santiago, Porto Praia	*Streptocaulus pulcherrimus* A, 1883
**Diplocheilus mirabilis* A, 1883:49	Australia: Bass Strait, off Moncoeur Is.	*Pycnotheca mirabilis* (A, 1883)
**Cladocarpus pectiniferus* A, 1883:50	Portugal: Azores	*Streptocaulus pectiniferus* (A, 1883)
Halicornaria plumosa A, 1883:52[29]	Brazil: Barra Grande	*Gymnangium allmanii* (Marktanner-Turneretscher, 1890)
Azygoplon rostratum A, 1883:54	Australia: off Port Philip	*Halicornopsis elegans* (Lamarck, 1816)
**Monocaulus imperator* A, 1885a:752[30]	N Pacific Ocean	*Branchiocerianthus imperator* (A, 1885a)
Campanularia carduella A, 1885b:132	New Zealand	nomen dubium
Sertularella margaritacea A, 1885b:133	Straits of Magellan	*Sertularella gaudichaudi* (Lamouroux, 1824)
Sertularella capillaris A, 1885b:133	New Zealand	*Symplectoscyphus johnstoni* (Gray, 1843)
Sertularella crassipes A, 1885b:133	South Africa: Cape of Good Hope	*Sertularella arbuscula* (Lamouroux, 1816)
Sertularella cuneata A, 1885b:134	South Africa: Cape of Good Hope	*Sertularella arbuscula* (Lamouroux, 1816)
Sertularella limbata A, 1885b:134	South Africa: Cape of Good Hope	*Symplectoscyphus secundus* (Kirchenpauer, 1884)
**Sertularella trimucronata* A, 1885b:135	Australia	*Symplectoscyphus trimucronatus* (A, 1885b)
**Sertularella trochocarpa* A, 1885b:135	Australia: Bass Strait	*Amphisbetia trochocarpa* (A, 1885b)
Sertularella diffusa A, 1885b:136	USA: New York, Rockaway	*Sertularia argentea* (Linnaeus, 1758)
Diphasia bipinnata A, 1885b:136	South Africa: Cape of Good Hope (?)	nomen dubium
Synthecium ramosum A, 1885b:137	New Zealand: Tauranga	*Synthecium elegans* A, 1872h
Sertularia aperta A, 1885b:138	South Africa: Cape of Good Hope	*Amphisbetia operculata* (Linnaeus, 1758)
Sertularia unilateralis A, 1885b:139	New Zealand and Australia	*Amphisbetia bispinosa* (Gray, 1843)
Sertularia crinis A, 1885b:139	New Zealand: Tauranga	*Amphisbetia operculata* (Linnaeus, 1758)
Sertularia crinoidea A, 1885b:141	South Africa: Cape of Good Hope	*Amphisbetia minima* (Thompson, 1879)
Sertularia amplectens A, 1885b:141	Atlantic Ocean, on floating gulfweed	*Tridentata marginata* (Kirchenpauer, 1864)
**Sertularia megalocarpa* A, 1885b:142	Australia (?)	*Amphisbetia megalocarpa* (A, 1885b)
Desmoscyphus orifissus A, 1885b:143	Australia: Bass Strait	*Amphisbetia geminata* (Bale, 1884)
Thuiaria interrupta A, 1885b:145	Australia	*Dynamena crisioides* Lamouroux, 1824
**Thuiaria diaphana* A, 1885b:145	Australia: Queensland, Moreton Bay	*Sertularella diaphana* (A, 1885b)
Thuiaria ramosissima A, 1885b:146	North America: NE coast	*Sertularia cupressina* Linnaeus, 1758
Thuiaria hippisleyana A, 1885b:146	Australia	*Crateritheca zelandica* (Gray, 1843)
**Thuiaria heteromorpha* A, 1885b:147[31]	Australia: Tasmania	*Amphisbetia heteromorpha* (A, 1885b)
**Thecocladium flabellum* A, 1885b:149	unknown	*Sertularella flabellum* (A, 1885b)
Aglaophenia chalarocarpa A, 1885b:150[32]	South Africa: Cape of Good Hope	*Aglaophenia pluma* (Linnaeus, 1758)
Aglaophenia perforata A, 1885b:150	St. Vincent and the Grenadines	*Aglaophenia latecarinata* A, 1877
Aglaophenia acutidentata A, 1885b:151	unknown	nomen dubium
Aglaophenia dolichocarpa A, 1885b:152	Australia	nomen dubium
Halicornaria mitrata A, 1885b:153	unknown	*Macrorhynchia filamentosa* (Lamarck, 1816)
Halicornaria cornuta A, 1885b:153	unknown	*Gymnangium arcuatum* (Lamouroux, 1816)
Lytocarpus ramosus A, 1885b:154	Australia: Bass Strait	*Aglaophenia divaricata* (Busk, 1852)
**Gattya humilis* A, 1885b:156	unknown	*Gattya humilis* A, 1885b
**Plumularia lagenifera* A, 1885b:157	Canada: Vancouver Island	*Plumularia lagenifera* A, 1885b
Plumularia multinoda A, 1885b:157	New Zealand: Tauranga	*Plumularia setacea* (Linnaeus, 1758)
**Stylactis vermicola* A, 1888:2	North Pacific (35°22'N, 169°53'E)	*Stylactella vermicola* (A, 1888)
Eudendrium vestitum A, 1888:3	Heard Island	*Bimeria vestita* Wright, 1859a
Halecium robustum A, 1888:10[33]	Kerguelen Is.:Baie Cumberland	*Hydrodendron arboreum* (A, 1888)
**Halecium arboreum* A, 1888:89[33]	Kerguelen Is.: Baie Cumberland	*Hydrodendron arboreum* (A, 1888)
**Halecium telescopicum* A, 1888:10	Australia: off Port Jackson	*Halecium telescopicum* A, 1888
**Halecium flexile* A, 1888:1	South Africa: Marion Is.; Chile: Patagonia: Puerto del Hambre	*Halecium flexile* A, 1888 *Halecium flexile* A, 1888
**Halecium fastigiatum* A, 1888:13	Tristan da Cunha: Nightingale Island	*Halecium fastigiatum* A, 1888

**Hydrozoa* A, 1888:13	South Africa: Simon's Bay	*Halecium dichotomum* A, 1888
**Halecium cymiforme* A, 1888:15	Chile: Patagonia, Puerto del Hambre	*Halecium cymiforme* A, 1888
**Diplocyathus dichotomus* A, 1888:17	Australia: Cape York, Somerset	*Hydrodendron dichotomum* (A, 1888)
Campanularia insignis A, 1888:19	Bermuda: Challenger Bank	*Thyroscyphus marginatus* (A, 1877)
**Campanularia tulipifera* A, 1888:20	Heard Island	*Tulpa tulipifera* (A, 1888)
**Campanularia ptychocyathus* A, 1888:20	Brazil: Bahia	*Clytia ptychocyathus* (A, 1888)
**Campanularia retroflexa* A, 1888:21	USA: Hawaii, Honolulu	*Campanularia retroflexa* A, 1888
Campanularia cheloniae A, 1888:22	unknown	nomen dubium
Thyroscyphus simplex A, 1888:25	Australia: Cape York, Somerset	*Thyroscyphus torresii* (Busk, 1852)
Hypanthea aggregata A, 1888:26	Kerguelen Island	*Silicularia rosea* Meyen, 1834
**Hypanthea hemispherica* A, 1888:27[34]	UK: Falkland Islands, Port William	*Silicularia hemispherica* (A, 1888)
**Calamphora parvula* A, 1888:29	Australia: off East Moncoeur Is.	*Calamphora parvula* A, 1888
**Hebella striata* A, 1888:30	Chile: Patagonia, Puerto del Hambre	*Hebella striata* A, 1888
**Halisiphonia megalotheca* A, 1888:31	Australia: 42°42'S, 134°10'E	*Halisiphonia megalotheca* A, 1888
**Lictorella cyathifera* A, 1888:36	Vanuatu: 16°45'S, 168°07'E	*Zygophylax cyathiferus* (A, 1888)
Cryptolaria humilis A, 1888:39[35]	Azores: 38°30'N, 31°14'W	*Cryptolarella abyssicola* (A, 1888)
**Cryptolaria abyssicola* A, 1888:40[35]	Australia: 42°42'S, 134°10'E	*Cryptolarella abyssicola* (A, 1888)
**Cryptolaria flabellum* A, 1888:40	Puerto Rico: Culebra Is.	*Acryptolaria flabellum* (A, 1888)
**Cryptolaria pulchella* A, 1888:40	USA: Hawaii, Honolulu	*Acryptolaria pulchella* (A, 1888)
**Cryptolaria crassicaulis* A, 1888:41[36]	Ascension Island	*Acryptolaria crassicaulis* (A, 1888)
**Cryptolaria geniculata* A, 1888:41	Fiji: Matuku Is.	*Stegolaria geniculata* (A, 1888)
**Cryptolaria gracilis* A, 1888:42	New Zealand: off East Cape	*Acryptolaria gracilis* (A, 1888)
Cryptolaria diffusa A, 1888:42[35]	Sierra Leone	*Cryptolarella abyssicola* (A, 1888)
Perisiphonia filicula A, 1888:44	Azores: 38°38'N, 28°28'30"W;	*Cryptolaria exserta* (Busk, 1858)
	Australia: Twofold Bay	*Cryptolaria exserta* (Busk, 1858)
**Perisiphonia pectinata* A, 1888:45	New Zealand: 37°34'S, 179°22'E	*Cryptolaria pectinata* (A, 1888)
**Grammaria stentor* A, 1888:48[37]	Kerguelen Island: Golfe du Morbihan	*Grammaria stentor* A, 1888
**Grammaria magellanica* A, 1888:48[37]	Falkland Islands: 51°05'S, 65°39'W	*Grammaria magellanica* A, 1888
**Grammaria insignis* A, 1888:49[37]	South Africa: Marion Island	*Grammaria insignis* A, 1888
Sertularia gracilis A, 1888:51[38]	Chile: Patagonia, Puerto del Hambre	*Symplectoscyphus filiformis* (A, 1888)
**Sertularia filiformis* A, 1888:90[38]	Chile: Patagonia, Puerto del Hambre	*Symplectoscyphus filiformis* (A, 1888)
**Sertularia annulata* A, 1888:52	Australia: off Port Jackson	*Sertularella annulata* (A, 1888)
**Sertularia leiocarpa* A, 1888:52	Tristan da Cunha: Nightingale Is.	*Sertularella leiocarpa* (A, 1888)
Sertularia unilateralis A, 1888:53[39]	Kerguelen Is.: Baie Accessible	*Sertularella unilateralis* A, 1876a
Sertularia secunda A, 1888:90[39]	Kerguelen Is.: Baie Accessible	*Sertularella unilateralis* A, 1876a
**Sertularia clausa* A, 1888:54	Argentina: 37°17'S, 53°52"W	*Sertularella clausa* (A, 1888)
**Sertularia implexa* A, 1888:54	Argentina: 51°35'S, 65°39"W	*Sertularella implexa* (A, 1888)
Sertularia exigua A, 1888:55[40]	Azores: 38°38'N, 28°28'30"W	*Sertularella conica* A, 1877
Sertularia laxa A, 1888:90[40]	Azores: 38°38'N, 28°28'30"W	*Sertularella conica* A, 1877
**Sertularia exserta* A, 1888:56	Heard Island	*Symplectoscyphus exsertus* (A, 1888)
**Sertularia echinocarpa* A, 1888:57	Kerguelen Island: Golfe du Morbihan	*Staurotheca echinocarpa* (A, 1888)
**Sertularia catena* A, 1888:58	Puerto Rico: Culebra Is.	*Sertularella catena* (A, 1888)
Sertularia geniculata A, 1888:59[41]	Indonesia: S of Pulau Kakolotan	*Sertularella producta* (A, 1888)
**Sertularia producta* A, 1888:90[41]	Indonesia: S of Pulau Kakolotan	*Sertularella producta* (A, 1888)
**Sertularia cylindritheca* A, 1888:59	Brazil: Bahia	*Sertularelloides cylindritheca* (A, 1888)
Sertularia integritheca A, 1888:60	Brazil: Bahia	*Hincksella formosa* (Fewkes, 1881)
Sertularia articulata A, 1888:61[42]	Kerguelen Is.: Golfe du Morbihan	*Antarctoscyphus elongatus* (Jäderholm, 1904)
Thuiaria quadridens A, 1888:66[43]	Argentina: 51°35'S, 65°39"W	*Sertularella quadrifida* Hartlaub, 1901
Thuiaria pharmacopola A, 1888:66	Azores: 38°38'N, 28°28'30"W	*Diphasia alata* (Hincks, 1855)
Thuiaria vincta A, 1888:68	Australia: Flinders Passage	*Sertularella quadridens* (Bale, 1884)
Thuiaria pectinata A, 1888:69	South Africa: Simon's Bay	*Thuiaria articulata* (Pallas, 1766)
Thuiaria hyalina A, 1888:69	Brazil: SE of Rio São Francisco	*Sertularella diaphana* (A, 1885)
Desmoscyphus pectinatus A, 1888:71[44]	Australia: off East Moncoeur Is.;	*Tridentata unguiculata* (Busk, 1852)
	Brazil: Bahia	*Tridentata marginata* (Kirchenpauer, 1864)
Desmoscyphus gracilis A, 1888:71	Bermuda: Challenger Bank	*Tridentata marginata* (Kirchenpauer, 1864)
Desmoscyphus obliquus A, 1888:72	Australia: Cape York, Somerset;	*Tridentata trigonostoma* (Busk, 1852)
	Brazil: Bahia	*Tridentata marginata* (Kirchenpauer, 1864)
Desmoscyphus acanthocarpus A, 1888:73	Brazil: Bahia	*Diphasia digitalis* (Busk, 1852)
**Hypopyxis labrosa* A, 1888:74	Australia: Twofold Bay	*Hypopyxis labrosa* A, 1888
**Staurotheca dichotoma* A, 1888:76	South Africa: Marion Island	*Staurotheca dichotoma* A, 1888
Dictyocladium dichotomum A, 1888:77	Australia: off East Moncoeur Is.	*Dictyocladium reticulatum* (Kirchenpauer, 1884)
**Synthecium campylocarpum* A, 1888:78	Australia: off Port Jackson	*Synthecium campylocarpum* A, 1888
**Synthecium alternans* A, 1888:80	Australia: off Port Jackson	*Hincksella alternans* (A, 1888)
Scyphozoa		
Stephanoscyphus mirabilis A, 1874c:271	France: Antibes	*Nausithoe punctata* Kölliker, 1853

Corallimorpharia

**Corynactis viridis* A, 1846a:417	Ireland: County Cork, Crookhaven UK: England, Cornwall	*Corynactis viridis* A, 1846a

Nomenclatural Notes

[1] *Monocaulos* Allman, 1864b was emended to *Monocaulus* by Allman (1872h: 395). Given prevailing usage (e.g., Svoboda & Stepanjants 2001; Bouillon *et al*. 2006; Vervoort 2009; WoRMS), *Monocaulus* can be deemed to be a correct original spelling (ICZN Art. 33.3.1), attributed to Allman (1864b). Svoboda & Stepanjants (2001) designated *Corymorpha groenlandica* (Allman, 1876b) as type species of the genus, believing Allman (1864b) had misidentified it as *C. glacialis* M. Sars, 1860 (see ICZN Art. 70.3). However, *C. groenlandica* was not an originally included species and is ineligible as type species of *Monocaulus*. By their actions, however, *Corymorpha glacialis*, one of two originally included species, is fixed as the type species (ICZN Art. 69.2.2).

[2] With much reservation, *Hypsorophus* Allman, 1864b is included as an available name. Its availability can be questioned under Art. 11.5, ICZN. Cornelius (1995) regarded it as an unused name (except for its brief reintroduction by Huvé 1952, 1953).

[3] *Heterostephanus* Allman, 1864c was established as a nomen novum for *Heteractis* Allman, 1864b, an invalid junior homonym of *Heteractis* Milne Edwards & Haime, 1851 (Anthozoa). As type species by monotypy of *Heteractis* Allman, 1864b, *Corymorpha annulicornis* Sars, 1860 is automatically fixed as the type species of *Heterostephanus* (ICZN Art. 67.8).

[4] Stechow (1921) regarded *Actinogonium* Allman 1872h as an invalid junior homonym of *Actinogonium* Schomburgk, 1847 (Bacillariophyceae), and *Actigia* was proposed by him as a replacement name for it. Although Schomburgk's generic name was based on a diatom, homonymy indeed exists because that genus had been classified as an animal ("Protozoa") at times in the past (ICZN Art. 2.2). Both *Actinogonium* Allman, 1872h and *Actigia* Stechow, 1921 are now included in the synonymy of *Coryne* Gaertner, 1774. The type species by monotypy of *Actinogonium* Allman (1872h), *A. pusillum* Allman, 1872h, is based on a misidentification. Allman recognized that *Syncoryna pusilla* sensu Van Beneden, 1844b was different from *Coryne pusilla* Gaertner, 1774. He evidently assumed that referring the nominal species to a new genus, while retaining the specific name and crediting it to Van Beneden, removed nomenclatural problems from the misidentification. Nomenclaturally, he is deemed to have established a new binomen, *Actinogonium pusillum* Allman, 1872h (ICZN Art. 11.10). Hincks (1868) earlier recognized the misidentification by Van Beneden and renamed that species *Coryne vanbenedenii*. Thus, the type species of *Actinogonium*, *A. pusillum* Allman, 1872h, is a junior objective synonym of *Coryne vanbenedenii* Hincks, 1868 (ICZN Art. 70.3.2).

[5] *Wrightia* Allman, 1872h is an invalid junior homonym of *Wrightia* L. Agassiz, 1862 (Hydrozoa), and has been replaced by *Aselomaris* Berrill, 1948 (Calder 1988: 19). Both *Wrightia* Allman and *Aselomaris* Berrill are currently included in the synonymy of *Pachycordyle* Weismann, 1883. Allman (1872h) spelled the name as *Wrightea* in the index of his work, but that is an incorrect original spelling and is not an available name (ICZN Art. 19.3).

[6] *Halatractus* Allman, 1872h is an invalid junior homonym of *Halatractus* Gill, 1862 (Pisces). The name is currently included in the synonymy of *Corymorpha* M. Sars, 1835.

[7] *Halicornaria* Allman, 1874b is an invalid junior homonym of *Halicornaria* Hincks, 1865.

[8] *Diplopteron* Allman, 1874b is an invalid junior homonym of *Diplopteron* Swainson, 1839, and a junior synonym of *Polyplumaria* G.O. Sars, 1874.

[9] *Antennella* Allman, 1877 and *Antenella* Allman, 1877 are original spellings of the same genus. Under the First Reviser Principle in nomenclature (ICZN Art. 24.2.3), *Antennella* was chosen as the correct original spelling by Bedot (1912).

[10] *Acanthella* Allman, 1883 is an invalid junior homonym of *Acanthella* Schmidt, 1862 (Porifera), and has been replaced by *Cladacanthella* Calder, 1997 (Calder 1997: 9).

[11] *Lytocarpus* Allman, 1883 is an unjustified emendation of *Lytocarpia* Kirchenpauer, 1872. In being the type species of *Lytocarpia* (by subsequent designation by Stechow, 1923: 244), *Sertularia myriophyllum* Linnaeus, 1758 is automatically the type species of *Lytocarpus* (ICZN Art. 67.8).

[12] *Diplocheilus* Allman, 1883 is an invalid junior homonym of *Diplocheilus* van Hasselt & Temminck, 1823 (Pisces), and has been replaced by *Pycnotheca* Stechow, 1919 (Calder 1997: 4).

[13] Totton (1930: 166) designated *Lictorella halecioides* sensu Allman (1888) (not *Lafoea halecioides* Allman, 1874b) as type species of *Lictorella* Allman, 1888. That binomen is a subjective junior synonym of *Zygophylax antipathes* (Lamarck, 1816).

[14] Unaware that Gosse (1858) had established the genus *Depastrum* for the staurozoan *Lucernaria cyathiformis* M. Sars, 1846, Allman (1860a) assigned the species to *Carduella*. After reading Allman's account, Gosse (1860) became convinced that his staurozoan, from southern England, was different from that of Sars, found in Norway, and he introduced the binomen *D. stellifrons* for his species. Allman (1860h) thereupon upheld *Carduella* as valid, believing that Gosse had originally misidentified the species upon which the diagnosis of *Depastrum* was based. A further taxonomic complication arose with the introduction by Milne Edwards (1860) of the generic name *Calicinaria* for *L. cyathiformis*. In resolving the tangled nomenclature, most subsequent authors seem to have followed Clark (1863: 545), who believed that Gosse had described adults and Allman juveniles of the species described by Sars. If so, the three generic names applied to the staurozoan are objective synonyms in having the same type species. *Depastrum*, the senior name, has been held to be valid in most works since then, with *L. cyathiformis* being assigned to it (e.g., Haeckel 1880; Mayer 1910b: 523; Kramp 1961: 300; Mills, C.E. Stauromedusae: list of all valid species. http://faculty.washington.edu/cemills/Staurolist.html, last seen 26 January 2014).

[15] In describing *Eudendrium bacciferum*, Allman (1859c) also applied the binomen *Corythamnium bacciferum* to the species.

[16] *Podocoryna sarsii* Steenstrup, 1850 and *Stylactis sarsii* Allman, 1864b were nomena nova for a distinct species originally subsumed within the scope of *Podocoryna carnea* M. Sars, 1846, and now referred to *Hydractinia* van Beneden, 1844a. Allman's name is an invalid junior homonym.

[17] *Tubularia pacifica* Allman, 1872h was proposed as a replacement name for *Thamnocnidia tubularoides* A. Agassiz, 1865. Fenchel (1905) believed it was conspecific with *T. larynx*, but *T. tubularoides* was considered unrecognizable by Fraser (1937: 54).

[18] *Aglaophenia elongata* Allman, 1874b is a permanently invalid junior primary homonym of *Aglaophenia elongata* Meneghini, 1845. Stechow (1921) established the replacement name *Aglaophenia longa* for Allman's species.

[19] *Selaginopsis fusca* Allman, 1876b is a junior homonym of *Selaginopsis fusca* (Johnston, 1847). Norman (1878) proposed *S. allmani* as a replacement for the junior name.

[20] *Thuiaria distans* Allman, 1877 is referable to *Sertularella* Gray, 1848, where it becomes a junior secondary homonym of *Sertularella distans* (Lamouroux, 1816). Stechow (1920) proposed *Sertularella sargassi* as a replacement name for Allman's binomen, but the oldest available name for the species is a synonym, *Sertularella diaphana* (Allman, 1885).

[21] *Thuiaria pinnata* Allman, 1877 is referable to *Sertularella* Gray, 1848, where it becomes a junior secondary homonym of *Sertularella pinnata* (Templeton, 1836). Hartlaub (1901) proposed *Sertularella pinnigera* as a replacement name for Allman's binomen, but the oldest available name for the species is the synonym *Sertularella diaphana* (Allman, 1885).

[22] *Thuiaria sertularioides* Allman, 1877 is referable to *Dynamena* Lamouroux, 1812, where it becomes a junior secondary homonym of *Dynamena sertularioides* Lamouroux, 1816 (Calder 1991). The oldest available name for the species is the synonym *Dynamena dalmasi* (Versluys, 1899).

[23] *Aglaophenia ramosa* Allman, 1877 was taken to be a junior homonym by Nutting (1900) and given the replacement name *A. allmani* (see Calder 1997).

[24] *Aglaophenia lophocarpa* Allman, 1877 and *A. apocarpa* Allman, 1877, published in the same work, are widely regarded as synonyms. Their relative priority was established by Bedot (1921), acting as First Reviser (ICZN Art. 24.2.2). Precedence was assigned to *A. apocarpa*.

[25] *Aglaophenia gracilis* Allman, 1877 is a permanently invalid junior primary homonym of *Aglaophenia gracilis* Lamouroux, 1816. Nutting (1900) proposed *Aglaophenia dubia* as a replacement name for Allman's species.

[26] *Aglaophenia perpusilla* Allman, 1877 and *A. latecarinata* Allman, 1877, published in the same work, are widely regarded as synonyms. Their relative priority was established by Calder (1997), acting as First Reviser (ICZN Art. 24.2.2). Precedence was assigned to *A. latecarinata*.

[27] Billard (1908a), acting as First Reviser (ICZN Art. 24.2.1), considered both *Plumularia flabellum* Allman, 1883 and *P. abietina* Allman, 1883 to be no more than varieties of *Plumularia insignis* Allman, 1883, thereby assigning precedence to the latter name.

[28] Given the existence of gonothecal nematothecae in this species, Galea (2010) believed it might be referable to *Halopteris* Allman, 1877 rather than *Plumularia* Lamarck, 1816.

[29] *Halicornaria plumosa* Allman, 1883 is a permanently invalid junior primary homonym of *Halicornaria plumosa* Armstrong, 1879. Marktanner-Turneretscher (1890) proposed *Halicornaria allmanii* (now *Gymnangium allmanii*) as a replacement name for Allman's species.

[30] The name *Monocaulus imperator* Allman, 1885a was introduced in the narrative of the Expedition of H.M.S. *Challenger*, accompanied by comments on size and an illustration by J.J. Wild. Several hydroids from two locations (34°37'N, 140°32'E; 37°41'N, 177°04'W), preserved for Allman from the expedition, were eventually deposited in the Natural History Museum, London. Wyville Thomson had noted that the specimens, when placed in preservatives, "…at once contract(ed) out of all form…" (Allman 1875e: 555). It was therefore fortunate that "…a drawing of it was made by Mr. J. J. Wild immediately after its capture, otherwise it would have been impossible to have given a correct delineation of its natural aspect" (Allman 1888: v).

[31] The specific name of *Thuiaria heteromorpha* Allman, 1885b (=*Amphisbetia heteromorpha*) was misspelled as *polymorpha* in the text on p. 149 of Allman's paper (1885b). Elsewhere in the text, and on the figure itself, it was spelled correctly.

[32] The specific name of *Aglaophenia chalarocarpa* Allman, 1885b was misspelled as *chalacocarpa* in the figure captions section of Allman's paper (1885b). In the text, on the figure itself, and in subsequent publications (e.g., Warren 1908; Billard 1910; Bedot 1916; Millard 1975) it has been spelled *chalarocarpa.* The correct spelling of the binomen is therefore taken to be *Aglaophenia chalarocarpa.*

[33] Allman (1888:10) initially established the name *Halecium robustum* for this species. Prior to publication, however, he realized that it was a homonym (of *Halecium robustum* Verrill, 1873) and replaced it with *Halecium arboreum*. The invalid junior primary homonym *Halecium robustum* Allman, 1888 is nevertheless available because it was used as a valid name by Vanhöffen (1910) (ICZN Art. 11.6.1).

[34] Now assigned to genus *Silicularia* Meyen, 1834, Galea *et al*. (2014) recognized this species as distinct from *S. rosea* Meyen, 1834. The spelling of the specific name is sometimes given as *hemisphaerica*, but the correct original spelling is *hemispherica*.

[35] After examining types of *Cryptolaria humilis* Allman, 1888, *C. abyssicola* Allman, 1888, and *C. diffusa* Allman, 1888, Vervoort (1966) concluded that all were conspecific. Acting as First Reviser (ICZN Art. 24.2), he assigned precedence to the name *C. abyssicola* Allman, 1888, as *Cryptolarella abyssicola*.

[36] The specific name of *Cryptolaria crassicaulis* was misspelled as *crassicaulus* in the index of Allman's (1888: 89) monograph. It has not been misspelled in subsequent work, to my knowledge.

[37] Cornelius (1975b) included *Grammaria stentor*, *G. magellanica*, and *G. insignis*, all from the southern South Atlantic, in the synonymy of the northern North Atlantic species *G. abietina* (M. Sars, 1850). This needs confirmation, as do relationships among the three listed as valid here.

[38] Allman (1888:51) initially established the name *Sertularia gracilis* for this species. Prior to publication, however, he realized that it was a homonym (of *Sertularia gracilis* Hassall, 1848) and replaced it with *Sertularia filiformis*.

[39] Allman (1888:53) initially established the name *Sertularia unilateralis* for this species. Prior to publication, however, he realized that it was a homonym (of *Sertularia unilateralis* Lamouroux, 1824 and *Sertularia unilateralis* Allman, 1885) and replaced it with *Sertularia secunda*. The nomenclature of the species then becomes complicated. Hartlaub (1901) referred *S. secunda* to *Sertularella* Gray, 1848, where it became a junior secondary homonym of *Sertularella secunda* Kirchenpauer, 1884, and he proposed *Sertularella allmani* as a replacement name for it. However, homonymy no longer exists because *Sertularella secunda* Kirchenpauer, 1884 is now included in *Symplectoscyphus* Marktanner-Turneretscher, 1890. A case could be made (ICZN Art. 59.3) for retention of *Sertularella secunda* Allman, 1888 as the valid name of the species, but that is unnecessary for the following reasons. *Sertularella secunda* Allman, 1888 and its replacement name *S. allmani* Hartlaub, 1901, as well as *S.unilateralis* Allman, 1876a, are now included as synonyms of *S. antarctica* Hartlaub, 1901 (e.g., Vervoort 1972; Galea *et al*. 2009). If this synonymy is accepted, *S. unilateralis* Allman, 1876a has priority over all of these names, including its junior objective synonym S. *antarctica* Hartlaub, 1901, and is the valid name of the species. As for *Sertularia unilateralis* Lamouroux, 1824, it is now included in *Symplectoscyphus* rather than *Sertularella* and is no longer a senior homonym of *Sertularella unilateralis* Allman, 1876a. Although the binomen *Sertularella antarctica* is in current use, it has been used only sparingly (for synonymy lists, see Galea *et al*. 2009; El Beshbeeshy 2011), and nomenclatural stability is not greatly threatened by adopting its senior synonym (*Sertularella unilateralis* Allman, 1876a) for the species.

[40] Allman (1888:51) initially established the name *Sertularia exigua* for this species. Prior to publication, however, he realized that it was a homonym (of *Sertularia exigua* Allman, 1877) and replaced it with *Sertularia laxa*. The replacement name is a permanently invalid junior primary homonym of *Sertularia laxa* Lamarck, 1816. A species referable to *Sertularella* Gray, 1848, it has been referred to *S. unituba* Calder, 1991 by Medel & Vervoort (1998). In turn, *S. unituba* has been considered a junior synonym of *S. conica* Allman, 1877 by Galea (2013).

[41] Allman (1888:59) initially established the name *Sertularia geniculata* for this species. Prior to publication, however, he realized that it was a homonym (of *Sertularia geniculata* Linnaeus, 1758) and replaced it with *Sertularia producta*. Although apparently unrecognized previously, that name is a junior primary homonym of *Sertularia producta* Stimpson, 1853 [=?*Tamarisca tamarisca* (Linnaeus, 1758)]. The junior name *Sertularia producta* Allman, 1888, now assigned to *Sertularella* Gray, 1848, has not been replaced here (ICZN Art. 23.9.5) because the originally homonymous names apply to taxa no longer considered congeneric.

[42] *Sertularia articulata* Allman, 1888 is now included in *Antarctoscyphus elongatus* (Jäderholm, 1904), although the justification originally given for the change by Peña Cantero *et al*. (1997) is nomenclaturally invalid. They found Allman's type to be unsuitable for redescription, and concluded that it was "…more useful to sink it [*S. articulata*] into the synonymy…" of *A. elongatus*. That violates the Principle of Priority in zoological nomenclature, and there is also no valid basis for reversal of precedence (ICZN Art. 23.9). The name change can be better justified because *Sertularia articulata* Allman, 1888 is a junior primary homonym of *Sertularia articulata* Pallas, 1766 [=*Thuiaria articulata*] and has been largely replaced by *A. elongatus*.

[43] *Thuiaria quadridens* Allman, 1888 is a junior primary homonym of *Thuiaria quadridens* Bale, 1884 (=*Sertularella quadridens*). Hartlaub (1901) proposed *Sertularella quadrifida* Hartlaub, 1901 as a replacement name for Allman's species.

[44] Totton (1930) discovered that two species were represented in syntype material of *Desmoscyphus pectinatus* Allman, 1888. Hydroids from Brazil were referable to *Tridentata marginata* (Kirchenpauer, 1864), while those from Australia were referable to *T. unguiculata* (Busk, 1852).

APPENDIX 3.

Publications by George James Allman on subjects other than Cnidaria, Ctenophora, Bryozoa, and Entoprocta, and not cited in the text.

Allman, G.J. (1843) On a new genus of algae belonging to the family of the Nostochinæ. *Annals and Magazine of Natural History*, 11, 161–165. [01 March 1843, see Evenhuis 2003: 15] [Genus *Trichormus* Allman, 1843; *Trichormus incurvus* Allman, 1843]

Allman, G.J. (1843) Notice of a new species of *Linaria*. *Proceedings of the Royal Irish Academy*, 2(41), 404–406. [Read 12 June 1843] [*Linaria sepium* Allman, 1843]

Allman, G.J. (1843) On the genus *Cirropteron*, Sars. *The Athenaeum*, 829, 851. [16 September 1843]

Allman, G.J. (1843) On certain peculiarities in the arteries of the six-banded armadillo. *The Athenaeum*, 829, 851. [16 September 1843]

Allman, G.J. (1843) On a new genus of terrestrial gasteropod. *The Athenaeum*, 829, 851. [16 September 1843] [Genus *Geomalacus* Allman, 1843; *Geomalacus maculosus* Allman 1843]

Allman, G.J. (1843) On the genus *Cirropteron*, Sars. *L'Institut, Journal Universel des Sciences et des Sociétés Savantes en France et à l'Étranger*, 12, 111. [not seen]

Allman, G.J. (1844) The anatomy of *Anthocephalus*, a genus of entozoal worms. *Proceedings of the Royal Irish Academy*, 2(42), 423–424. [Read 13 November 1843]

Allman, G.J. (1844) On certain peculiarities in the arteries of the six-banded armadillo. *Report of the Thirteenth Meeting of the British Association for the Advancement of Science; held at Cork in August 1843; Notices and Abstracts*, 68. [Published no later than 02 December 1844: see *Proceedings of the Royal Society of Edinburgh*, 2: 3]

Allman, G.J. (1844) On the genus *Cirropteron*, Sars. *Report of the Thirteenth Meeting of the British Association for the Advancement of Science; held at Cork in August 1843; Notices and Abstracts*, 77. [Published no later than 02 December 1844: see *Proceedings of the Royal Society of Edinburgh*, 2: 3]

Allman, G.J. (1844) On a new genus of terrestrial gasteropod. *Report of the Thirteenth Meeting of the British Association for the Advancement of Science; held at Cork in August 1843; Notices and Abstracts*, 77. [Published no later than 02 December 1844: see *Proceedings of the Royal Society of Edinburgh*, 2: 3]

Allman, G.J. (1845) A notice of two undescribed algae. *Proceedings of the Royal Irish Academy*, 3(50), 67–68. [Read 24 February 1845]

Allman, G.J. (1845) On the anatomy of *Actæon*, with remarks on the order Phlebenterata of M. de Quatrefages. *Annals and Magazine of Natural History*, 16, 145–162. [01 September 1845, see Evenhuis 2003: 16]

Allman, G.J. (1845) On a new genus of nudibranchiate Mollusca. *Report of the Fourteenth Meeting of the British Association for the Advancement of Science; held at York in September 1844; Notices and Abstracts*, 65. [Published no later than November 1845: see *Philosophical Transactions of the Royal Society of London*, 135: Presents Section p. 2] [*Alderia* Allman, 1845]

Allman, G.J. (1845) On the anatomy of *Acteon viridis*. *Report of the Fourteenth Meeting of the British Association for the Advancement of Science; held at York in September 1844; Notices and Abstracts*, 65–66. [Published no later than November 1845: see *Philosophical Transactions of the Royal Society of London*, 135: Presents Section p. 2]

Allman, G.J. (1846) Note on a new genus of nudibranchiate Mollusca. *Annals and Magazine of Natural History*, 17, 1–5. [01 January 1846, see Evenhuis 2003: 16] [*Alderia modesta* Allman, 1846]

Allman, G.J. (1846) Description of a new genus of pulmonary gasteropods. *Annals and Magazine of Natural History*, 17, 297–299. [01 May 1846, see Evenhuis 2003: 16]

Allman, G.J. (1846) On the anatomy of *Polycera quadrilineata*. *Proceedings of the Royal Irish Academy*, 3(52), 220–221. [Read 13 April 1846]

Allman, G.J. (1846) Description of the fruit of some of the Hepaticæ. *Report of the Fifteenth Meeting of the British Association for the Advancement of Science; held at Cambridge in June 1845; Notices and Abstracts*, 71–72. [Published no later than 20 July 1846: see *Proceedings of the Royal Irish Academy*, 3: 295]

Allman, G.J. (1846) On a monstrosity occurring in *Saxifraga* Geum. *Report of the Fifteenth Meeting of the British Association for the Advancement of Science; held at Cambridge in June 1845; Notices and Abstracts*, 72. [Published no later than 20 July 1846: see *Proceedings of the Royal Irish Academy*, 3: 295]

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Allman, G.J. (1847) On certain peculiarities in the anatomy of *Limax sowerbii*. *Report of the Sixteenth Meeting of the British Association for the Advancement of Science; held at Southampton in September 1846; Notices and Abstracts*, 82–83. [Published no later than 30 June 1847: see *Quarterly Journal of the Geological Society of London*, 3: 439]

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Allman, G.J. (1847) Biological contributions. No. III. Description of a new genus and species of Entomostraca. *Annals and Magazine of Natural History*, 20, 1–9. [01 July 1847, see Evenhuis 2003: 17] [Genus *Notodelphys* Allman, 1847; *Notodelphys ascidicola* Allman, 1847]

Allman, G.J. (1847) Biological contributions. No. IV. Description of a new genus and species of tracheary arachnidans. *Annals and Magazine of Natural History*, 20, 47–52. [01 July 1847, see Evenhuis 2003: 17] [Genus *Halarachne* Allman, 1847; *Halarachne halichoeri* Allman, 1847]

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